Timber Basin Wildfire Rehabilitation
And
Timber Salvage

Environmental Assessment
OR 054-01-115

Bureau of Land Management
Prineville District
Central Oregon Resource Area
Prineville, Oregon

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Title: Timber Basin Wildfire Rehabilitation and Timber Salvage
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Table of Contents

1. Purpose and Need

The purpose of this project is to address restoration and rehabilitation of the burned area in Timber Basin; to address recovering the economic value of the burned timber; and to restore forest health in the area. This action is needed because of the impact of the wildfire, which occurred in the area in August of this year. This project seeks to evaluate the environmental concerns and assess potential management actions to minimize and/or mitigate the impacts of the wildfire suppression activities. The primary focus and aim of this project is to address the following objectives:

1. Reduce soil erosion due to wildfire and suppression disturbance;
2. Accelerate the recovery of wildlife habitat;
3. Recover the economic value of the burned timber; and to
4. Maximize the re-establishment of a healthy forest ecosystem.

1.1 Concerns/Questions

Throughout the initial project description process the interdisciplinary team developed and refined specific concerns and focus areas within each of these objectives. The following questions and descriptions clarify these concerns:

How would we reduce erosion and loss of topsoil in the intensely burned areas to maintain long-term soil productivity?

The potential for erosion is affected by the amount of bare soil surface exposed and the type and amount of precipitation expected within the area. Protecting the soil surface area is important for soil retention and productivity.

How would we reduce the effects of soil displacement and compaction from proposed ground based harvesting activities in the burn area so that long-term soil productivity is maintained?

A decrease in soil productivity due to removal of topsoil (soil surface displacement) and surface compaction can be expected from ground based harvest activities. Protecting soils from displacement or compaction during and after harvesting activities is an important component of project design.

What are the primary wildlife habitats in the area?

The Timber Basin area contains big game habitat used by elk and deer. It is outside of winter range habitat for these species and prior to the fire acted as somewhat of a refugia area due to the absence of roads into the basin. Elk and deer use both marginal and optimal cover types within the area. Hunters and other recreationists visit the area for these big game species.

What type, if any Threatened and Endangered or Sensitive species considerations exist in the area?

There are no designated critical habitat areas for sensitive species within the area. The area is included within the habitat range for several special status species. Therefore special status species may use the area to varying degrees during their life history.

What has the wildfire done to change species usage of the area and how can these uses be restored?

The wildfire destroyed many acres of moderate to high value cover areas, and left stands more open and accessible. Cover areas were significantly reduced and the refugia value of the area have been decreased by the resulting openness of forest stands and increased access to pre-existing, previously non-accessible roads.

How can the economic value of the burned timber be recovered in an area designated for commercial timber harvest without detrimental effects to soils, wildlife habitat and forest health?

Recovering the economic value of the burned timber would be a benefit to the local economy and would reduce the probability of future insect infestations in the area. Harvest of timber could lead to various effects to soils, wildlife habitats and forest health. The types of harvest methods used and mitigations stipulated may accommodate concerns for the resources involved.

Would it be beneficial to commercially harvest the green timber within the analysis area concurrently with salvage and rehabilitation efforts?

The Timber Basin area is designated as part of the commercial timber base within the John Day RMP (USDI BLM 1985a). The area has been impacted by suppression activities and may subsequently be impacted by salvage activities. A commercial harvest of the green trees coinciding with salvage harvest could eliminate the need to re-enter this area again for 20-50 years. Otherwise forest health or timber harvest issues may necessitate a re-entry in less than 10 years.

Should we treat green tree areas included within the analysis area that have forest health concerns?

Forest Health conditions prior to the fire were marginal and declining in some areas. Wildfire destroyed many of these areas; however, several remain that exhibit high stocking densities or stagnated growth.

This environmental assessment (EA) addresses two focus areas: 1) fire rehabilitation; and 2) harvest of dead timber and green tree thinning. The format for the document includes: a discussion of the alternatives developed to achieve the described objectives; a discussion of the existing environment in the Timber Basin area; an analysis of effects

with regard to the alternatives; and various appendices which provide additional information related to topics discussed in the EA. This EA will result in a selected alternative or a combination of actions that will be proposed for implementation.

1.2 Background

The Timber Basin fire boundary includes the upper headwater areas of Franks Creek (primarily), Ferris Creek and Dick Creek. It is located approximately 10 miles north of Dayville, Oregon, in Township 11 south and Range 27 east. The fire burned during late August 2001 and was part of the Monument Complex. Suppression efforts for this fire were under the jurisdiction of the Oregon Department of Forestry, in addition the BLM provided Resource Advisors during the wildfire. The Franks Creek public road crosses through the center of the burned area to converge with the Dick Creek road on the western wildfire perimeter. In addition to this public road the Timber Basin area contains another, older road, which follows the stream bottom; however, private land access blocks public access into this lower area. The area is a popular hunting recreation area primarily for big game species.

1.3 Conformance with Existing Plans

The Timber Basin area is managed under direction given by the John Day Resource Management Plan (RMP) and associated Record of Decision (USDI BLM, 1985a & b). Direction in this RMP designates this area as part of the BLM commercial timber base managed for timber production.

The proposed actions as addressed in this EA are consistent with the John Day RMP, as stated in the Record of Decision (ROD)(USDI BLM 1985b):

> " The overall goal of the plan is to emphasize production of livestock forage and other commodities while accommodating wildlife, recreation, visual resources, water quality and wild horses. The multiple use trade-offs between resources help maintain and protect big, small and non-game habitat, riparian and aquatic habitat, recreation use, cultural and botanical resources, esthetics, and wild horses." (Page 12.)

Timber Basin is included within the 30,962 acres that are designated within the John Day RMP/ROD as "available for full timber production" for the "commercial tree species" (page 13). The following guidance also pertains to the area:

> "Manage forestland to minimize losses or damage to commercial tree species from insects and disease. Develop road systems and manage for harvest of commercial tree species…" (page 13).
>
> "Utilize existing road systems and limit new permanent road entries by emphasizing the use of special timber harvest techniques. Restrict human activity

adjacent to active raptor nesting and roosting areas during specific periods of the year." (Page 18).

All actions addressed are also consistent with guidance and direction that supercedes the 1985 RMP such as the Environmental Assessment for the interim strategies for managing anadromous fish producing watersheds in eastern Oregon and Washington, Idaho and portions of California (PACFISH).

"Prohibit timber harvest, including fuel-wood cutting, in Riparian Habitat Conservation Areas." (Page C-10 - Timber Management).

2. Alternatives

This chapter describes a range of four alternatives, including the no action alternative, which address the objectives and concerns as described in Chapter 1 – Purpose and Need. Each alternative description includes a brief narrative followed by specific design criteria and a summary of concerns addressed.

2.1 Alternative A – No Action

This alternative does not include any further management actions beyond suppression activities. The conditions as a result of the fire in Timber Basin would remain. Natural processes would be the sole driving force in the recovery process. The burn intensity pattern as it exists as a result of the fire would also remain. No soil protection or erosion control actions would occur in intensely burned areas. Forest stands would be left in current conditions. This includes sizable areas of intense burn with interspersed areas of less intense burn with intermittent tree mortality in all age classes. No salvage harvest would occur to capitalize on the economic value of the dead trees or to protect against major infestations of beetles or other parasitic insects that could lead to further damage of adjacent green timber areas. No timber harvest in green areas would occur to promote forest health and minimize forest management entries in the area.

Separate from this analysis all dozer lines created as a result of fire suppression activities have had some rehabilitation such as installing water bars to drain water and to stabilize soils. The dozer lines would not be effectively closed to motorized traffic, which could lead to motorized use in these areas and create access into the Timber Basin area that did not exist prior to the fire. In addition the four allotment management pastures that were included within the burn boundary would be rested from grazing for a period of two years to allow recover of vegetation (USDI FWS 2001).

There are no specific design criteria for this alternative. All designs are left to natural processes.

This alternative addresses recovery of wildlife habitats, soil erosion and productivity at a rate of natural recovery. It does not address recovery of any economic value, nor does it address management actions to promote forest health concerns.

2.2 Alternative B – Rehabilitation and Salvage

This alternative describes active rehabilitation of the analysis area (i.e. the burn boundary and associated access roads to area) and salvage harvest of dead timber. This alternative seeks to address the objectives through promoting a return to a desirable condition based on potential natural vegetation (see Appendix A), forestry, wildlife, soils and hydrology values, and recovering the value of the burned timber.

This alternative has two major components: 1) wildfire rehabilitation; and 2) salvage harvest and addresses all objectives as described in Chapter 1 – Purpose and

Need. Active rehabilitation efforts are proposed to minimize soil loss and mitigate for soil impacts from suppression activities and several pre-existing roads in the area. Harvest activities would recover the economic value of he burned timber and effectively lower the probability for insect infestations which could impact green trees in the area. Harvest activities would only occur within burned timber stands greater than 1-acre in size and utilize the existing roads and dozer lines wherever possible in order to minimize ground disturbance and protect soils. Two new access roads for landing areas area proposed to access several areas which would be obliterated upon completion of harvest. Buffer widths for streams and springs in this alternative are equal to twice the recommended PACFISH buffer widths for non-fish bearing streams (100 feet) to further protect the drainage bottoms and protect water quality concerns.

2.2.1 Rehabilitation

Wildfire and suppression activities without adequate rehabilitation can lead to increased erosion, decreased water quality and decreased forest health. Effective application of post-fire rehabilitation treatments to the moderately and severely burned areas would help reduce the detrimental effects that increased soil erosion would have on soil productivity and the effects sedimentation could have on water quality.

Newly created roads and dozer lines in the area as a result of fire suppression activities would be reclaimed, and returned to a pre-fire condition through ripping, re-contouring (slope and drainage), grass planting, weed treatments and wood refuse or live tree placement to discourage motorized access. This would minimize soil loss and erosion concerns in this areas. Road densities would be decreased through reclamation of a pre-existing road that was inaccessible prior to the fire (See Map – Road Treatments - Rehabilitation). Several main access roads would be improved to mitigate for erosion and runoff concerns from roads and dozer lines created during fire suppression activities or roads existing prior to the fire.

All of the intensely burned areas would be aerial seeded with a mixture of perennial native and desirable non-native grasses and subsequently re-planted with a mixture of desirable tree species based on potential natural vegetation. The use of desirable non-native species such as winter wheat would stabilize the soils prior to spring runoff, native perennials would provide longer term soil stabilization and re-forestation efforts would lead to a return of desirable forest conditions. Several acres of the burn area would also be planted with Native American desirable shrubs (see Appendix B). Re-establishment of desirable shrubs in the area would provide for Native American concerns within the area. Hydro-seeding, the placement of straw mats and appropriate shrub and tree plantings would occur in specific areas such as drainage crossings. Hydro-mulching in areas of heavy erosion potential associated with dozer lines and roads provides seeds with a higher chance of survival.

Small diameter trees would be fallen and left in steep slope, intensely burned areas to curtail and limit soil erosion and mass wasting in these areas.

The entire burn area would be closed to off-road motorized vehicular access and firewood cutting for a time period of three (to protect grass recovery), five (to protect seedling establishment) or ten (to protect snag retention) year.

2.2.2 Salvage

All intensely burned areas would be commercially harvested removing all commercially viable trees except for those left as snags. Snags numbers to be left are described by the Ochoco Viable Ecosystems (USDA FS 1993). Snag management levels and distribution were identified using the most recent scientific data regarding snag densities with the recognition of the uniqueness of the burned community, surrounding habitats, and management allocation. Snag numbers selected come from the Ochoco National Forest Viable Ecosystems Guidelines. These guidelines were developed on a plant community basis considering forest structure and disturbance patterns. The Ochoco Viable Ecosystems Guidelines have received extensive scientific review, including Governor John Kitzhaber's Scientific team. The analysis method outlined in the guide has been utilized to analyze over 1 million acres of Blue Mountain habitat similar to those found in the analysis area, some as close as 10 miles from the analysis area. In 1998 the Ochoco NF and the Prineville BLM completed a Sub-basin review for the Upper Crooked River (approximately 600,000 acres). This sub-basin review is being used as an example by ICBEMP of an appropriate process and scale for stepping down analysis from that done by ICBEMP. The Ochoco NF Viable Ecosystems guide identifies ranges of snags based on the vegetative composition, structure, and disturbance and is easily compared to the interim standards in ICBEMP (See Table 1 of the wildlife report in Appendix C). Recommended snag and down log levels identified in the Viable Ecosystems guide provide a range of potential conditions recognizing the potential for different disturbance patterns to have taken place on a given piece of land. Snag and down log levels identified in ICBEMP generally fall in the middle of the range of numbers identified in the Viable Ecosystem Guide. Snag numbers in all alternatives recognized that in the intensely burned areas the majority of live trees were killed by the fire thus there would be a period of 100 – 200 years prior to sufficient size trees to provide large snags. Leaving higher snag numbers in the intensely burned areas would provide increased numbers of snags with potential to be used as source habitats for woodpeckers and subsequently for secondary cavity users, provide unique habitats, facilitate nutrient cycling, and provide nursery sites for trees and shrubs.

Within the intensely burned areas snag numbers would equal 150 percent of the high end natural variability as defined by the Ochoco National Forest historic range of variability (HRV). In non-intensely burned areas snags numbers would equal 100 percent of the high end natural variability (see Appendix C – Wildlife Report). In addition all downed logs existing would be left on site.

Approximately 40 percent of the non-intensely burned areas exhibit tree mortality. Salvage would also include these areas that are a minimum of 1 acre in size, all smaller mortality areas would remain un-harvested to protect from ground disturbance.

Several new roads and landings would be created and subsequently obliterated upon completion of harvest.

Based on soil compaction and erosion concerns due to topography (i.e. slope) the entire analysis area has been designated for particular harvest methods – aerial yarding or ground-based yarding (i.e. helicopter vs. tractor). A 35 percent slope cut-off was used to divide these areas. Table 1 describes acreages within each group. In addition see Map – Harvest Methods.

Table 1. Acreages for Yarding Systems and Actual Harvest Acres

System	Total	Alternative B	Alternative C	Alternative D
Helicopter	636	422	480	444
Tractor	610	294	362	331
Actual	1246	716	842	775

* This Table was updated on 11/28/01

All intermittent and ephemeral streams and springs would have a 100 foot no harvest buffer limit disturbance near drainages and protect water quality. Harvest volume equals approximately 4.4 mmbf at a net value of $ 880,000 – $ 1,320,000 income to the government.

All harvest activities would occur between December 1 and March 31. Activities would occur over 4-6 inches of frozen ground with a minimum of 10 inches of snow or would be limited to a maximum of 20 percent disturbance of the tractor harvest area. Skid trails would be a minimum of 100 feet apart. Wherever possible existing roads and trails would be utilized for harvest activities and upon completion of harvest activities all newly created roads and skid trails would be reclaimed through re-contouring and reseeding. These actions would reduce the on-the-ground impacts of harvest and protect soil productivity.

All existing log decks as a result of fire suppression activities would be included in salvage volume. All trees with identified raptor nests would be retained to protect nesting and roosting areas. A buffer would be included around all unburned rock outcroppings to protect the unique character of these areas. No reforestation would occur in unburned areas. The Dick Creek road and Franks Creek road would be upgraded as necessary to provide for log hauling and protection of water quality and erosion.

2.3 Alternative C – Rehabilitation, Salvage and Green Tree Thinning 1

This alternative describes active rehabilitation of the analysis area (i.e. the burn boundary and associated access roads to area), salvage harvest of dead timber and green tree commercial and pre-commercial thinning in areas with >=70 percent canopy closure. This alternative seeks to address the objectives through promoting a return to a desirable condition based on potential natural vegetation, forestry, wildlife, soils and hydrology

values, recovering the value of the burned timber, and treating specific acreages with overstocked conditions.

This alternative has three major components: 1) wildfire rehabilitation; 2) salvage harvest; and 3) green tree thinning, and addresses all objectives as described in Chapter 1 – Purpose and Need. Active rehabilitation efforts are proposed to minimize soil loss and mitigate for soil impacts from suppression activities and several pre-existing roads in the area. Harvest activities would recover the economic value of the burned timber and treat green tree areas that are overstocked and exhibit marginal forest health (i.e. are susceptible to catastrophic fire events or insect infestations). Harvest activities would be limited to areas greater than 1-acre in size and would use the existing roads and dozer lines wherever possible. Green tree thinning areas would total approximately 145 acres and would harvest evenly within all age classes to enhance forest health within these areas and maximize the timeframe before re-entry for management purposes is necessary. Two new access roads for landing areas would be created and subsequently obliterated upon completion of harvest. Buffer widths for streams in this alternative are equal to the recommended PACFISH buffer widths for non-fish bearing streams (50-feet); for springs buffer widths equal 200-feet which provides cover for big game which use these areas.

2.3.1 Rehabilitation

Same as Alternative B.

2.3.2 Salvage

Same as Alternative B with the following exceptions:

All intermittent and ephemeral streams would be given a 50 foot no harvest buffer. All unburned spring areas would be given a 200 foot buffer to include all non-intensely burned areas. Snags in non-intensely burned areas would be left at 100 percent of the low end of natural variability (see Appendix C – Wildlife Report). All downed logs in intensely burned areas would be left and a minimum of 300 linear feet of downed logs would be left in non-intensely burned areas, 40 percent of which would be in the >=20 inches size class, to provide for species which use downed wood such as amphibians.

2.3.3 Green Tree Thinning

This alternative includes green tree commercial and pre-commercial thinning in stands with >=70 percent canopy closure to promote the growth and recruitment of large tree structure, enhance the health of the stand by decreasing overstocked areas and minimizing the chance for insect infestation through removal of the stressed trees. Commercial thinning would occur within all size classes >=9 inches DBH in areas of >=70 percent canopy closure. An average of 30-36 foot spacing would be left to promote growth of larger trees leaving a minimum of 3 trees per acre >=21 inches DBH to maintain a level of large tree structure. Pre-commercial thinning would occur in areas of >=70 percent canopy closure for trees <=9 inches DBH. All ‘dead’ and green commercial

thinning harvest volume equal to approximately 6.9 mmbf at a net value of approximately $ 1,380,000 - $ 2,070,000 income to the government.

Green trees would be yarded whole and slash piled and burned at the landings, some opportunity may be available for firewood cutting on landings after harvest activities are completed.

2.4 Alternative D – Rehabilitation, Salvage and Green Tree Thinning 2

This alternative describes active rehabilitation of the analysis area (i.e. the burn boundary and associated access roads to area), salvage harvest of dead timber and green tree commercial and pre-commercial thinning in areas with even aged stands and >=40 percent canopy closure. This alternative seeks to address the objectives through promoting a return to a desirable condition based on potential natural vegetation, forestry, wildlife, soils and hydrology values, recovering the value of the burned timber, and treating specific acreages with even aged and overstocked conditions.

This alternative has three major components: 1) wildfire rehabilitation; 2) salvage harvest; and 3) green tree thinning; and addresses all objectives as described in Chapter 1 – Purpose and Need. Active rehabilitation efforts are proposed to minimize soil loss and mitigate for soil impacts from suppression activities and several pre-existing roads in the area. Harvest activities would recover the economic value of the burned timber and treat green tree areas that are overstocked and exhibit an even aged, stagnated structure. Harvest activities would be limited to areas greater than 1-acre in size and would utilize the existing roads and dozer lines, no new road would be created. Green tree thinning areas would total approximately 100 acres and would not harvest trees >=21 inches DBH to promote retention of the large structure. Buffer widths for streams in this alternative are equal to twice recommended PACFISH buffer widths for non-fish bearing streams (100-feet) to further protect these areas and water quality; for springs buffer widths equal 300-feet which would provide more cover for big game species using these areas. This alternative also proposes several closures of pre-existing roads within the area for various resource concerns including: wildlife, hydrology and soils.

2.4.1 Rehabilitation

Same as Alternative B with the following exceptions:

This alternative proposes to close two 2-track roads in existence prior to the fire to all motorized traffic by road obliteration and reclamation. These roads include one in section 20 along the north rim to the west and one in section 30 off the main Franks Creek road (See Map – Road Treatments – Alternative D). This action would decrease motorized disturbance of wildlife in areas adjacent to these roads.

2.4.2 Salvage

Same as Alternative B with the following exceptions:

This alternative addresses the objectives and concerns outlined in Chapter 1 - Purpose and Need without creating any further disturbance of the ground and associated soils resource to minimize impact to the soil resource. It also promotes retention of the large tree component as defined in Quigley and Arbelbide, 1997 (>=21 inches DBH size trees). No new roads would be constructed in this alternative. Harvest of intensely burned areas would occur where the existing road network accesses these areas. Harvest of dead trees in non-intensely burned areas would occur only when these areas are adjacent to an intensely burned area or unburned treatment areas that are accessible with the existing road and dozer line network to minimize ground disturbance in areas not previously impacted. Skidding would be allowed across the area if the frozen ground and snow depth criteria are met; if, however, this condition is not met a maximum skidding length of 1000 feet from an existing road and a 20 percent ground disturbance maximum would be imposed to limit ground disturbance. All harvest would occur outside of a 100 foot buffer along all ephemeral and intermittent streams to protect the drainage areas from disturbance. A 300 foot buffer on all unburned springs would also apply and would include only those areas within that buffer not intensely burned. All downed logs existing would be left on site and no trees would be felled to create downed logs. Snag retention in the non-intensely burned harvest areas would be equal to 100 percent of the high end natural variability for forest stand types as defined by the Ochoco National Forest historic range of variability (HRV) (see Appendix C). In addition all larger trees >=21 inches DBH with >=10 percent and <=30 percent live crown would be remain un-harvested. Most of these trees are not expected to live. This would effectively retain more, larger snags within the area and promote species such as cavity nesters which use this type of habitat.

2.4.3 Green Tree Thinning

Pre-commercial thinning would occur in areas with a large tree component and dense seedling/sapling under story. Commercial thinning would occur in forest stands which exhibit a >=40 percent canopy closure. All multi-layered canopy areas of mixed conifers and 5 percent of all unburned thicket areas would remain undisturbed. All live, large trees >=21 inches DBH would remain unharvested. All dead and live harvest volume equals approximately 3.5 mmbf at a net value of $ 700,000 - $ 1,050,000 income to the government.

2.5 Design Criteria Common to All Action Alternatives

2.5.1 Rehabilitation

1. Reclaim all dozer lines through water bars, ripping, re-contouring where slopes were altered, leveling berms, pulling trash wood onto trail and reseeding with winter wheat and desirable perennial native and non-native grasses with a rangeland drill to curtain erosion and stabilize soil.
2. Obliterate road along Franks Creek from previous end in section 19 to junction of uppermost private land access route. This closure would use large tree plantings within the road to camouflage the road entrance and discourage traffic (See Map –

Road Treatments – Rehabilitation for location). This would return the basin area to its previous condition of no motorized access and curtail erosion from the road.

3. Reconstruct ephemeral drainage crossings across roads and dozer lines, use straw mats, sedimats or hydro-seeding to curtail erosion in these areas.
4. Hydro-seeding/hydro-mulching in site-specific areas associated with road and dozer lines with potential for excessive erosion. Areas disturbed by the closing of access to rehabilitated dozer lines would be hydro-seeded. Disturbance areas associated with culvert installation would also be hydro-seeded. Any future sites with erosive problems associated with the burn and rehabilitation activities may be hydro seeded if that is deemed the cheapest, most ecologically sound option.
5. Replace two culverts on the road adjacent to Franks Creek – one on private land and one on public land along the main public access route.
6. Rehab all springs with straw mats, hand reseeding of native riparian vegetation, spring along Franks Creek road lower end – re-seed, install a trough and fence to protect disturbed area to return this spring to a functioning condition.
7. Contour falling in steep slope areas to limit overland erosion, using small diameter trees in specific spacing.
8. Aerial seeding of intensely burned areas (areas burned over on ground and areas with burned over story) to promote soil retention and limit erosion. Winter wheat in fall 2001, replant/reforest in spring 2002 with desirable tree species in percentages that they were present before the burn, fall 2002 seed desirable perennial native and non-native grasses if natural regeneration is not occurring (i.e. significant areas of soil and ash without evidence of regeneration occurring)
9. Chemical treatment of weeds on dozer lines and areas of new establishment of weeds, typically Scotch Thistle. It is anticipated there would be an estimated 20 acres of Scotch thistle located on disturbed areas, which would need control measures. Treatment would include chemicals, probably 2-4-D, for 2-3 years. Actions of this type are discussed in the District Noxious Weed Management Environmental Assessment No. OR-054-04. (USDA-BLM 1994).
10. Chemical treatment of all major public access routes – Franks Creek and Dick Creek roads, for dust abatement. The native surface of the Franks Creek road is a source of fine sediment that reduces pool volume and embeds spawning gravels. To reduce this sediment, a surface treatment with lignin sulfonate, calcium chloride or magnesium chloride should be placed on the road prior to log haul. A review of literature indicates the LC-50 for rainbow trout of lignin sulfonates is 6,400 ppm (parts per million) compared to 45,000 ppm for calcium chloride at 35 percent concentration and 9,000 ppm for magnesium chloride at 35 percent concentration (Heffner, 1997). Because of the proximity of the road to the stream and higher LC-50 rating, calcium chloride would be the preferred dust abatement compound.
11. Improve upper Dick Creek road where dozed (road shaping and smoothing with turnouts then surface with gravel), install rolling dips and improve the hydrologic function of the road in Section 30 which connects the main Franks Creek road to private lands also in Section 30. These actions would lower the erosion potential from both of these roads.

12. Replant aspen, other desirable hardwoods and desirable shrubs (elderberry, chokecherry, huckleberry, mockorange, etc.) in specific areas such as springs or seeps or within the drainages. As a result of the burn riparian areas are much more open to sunlight penetration, these species would add to stability of riparian areas and have a chance at survival.
13. Close entire burn area to off-road motorized access for a period of 3, 5 or 10 years. Various concerns mandate different timeframes for rehabilitation. For strictly soil and erosion concerns a three-year timeframe to establish grass cover would be required. Reforestation concerns increase the no disturbance timeframe to 5 years to allow for adequate re-establishment of tree seedlings. Wildlife concerns over snags (use of snags left for wildlife as firewood sources if off-road access is allowed) increases the no disturbance/off-road access closure to 10 years.
14. Rest pastures containing portions of the burn area for a minimum of 3 years to promote the re-establishment of grasses and minimize soils and erosion concerns. Replace 6 miles of fence destroyed or damaged in fire.
15. Plant 20 acres of wildlife/Native American preferred shrubs with appropriate wildlife control measures to provide for cultural concerns identified in coordination.
16. Close entire area to firewood cutting for ten years in burn boundary to protect snag retention in the area.
17. The two-track road off the main Franks Creek road that connects with private lands in Section 30 would be improved to include water bars and rolling dips in order to limit erosion from this source. A culvert would also be installed where this road crosses the drainage. These action would curtain erosion from this road entering the drainage.

Table 2 describes each of these design criteria as they apply to the measures used to evaluate them.

Table 2. Rehabilitation actions proposed and related measures.

Action	Measure
Dozer Line Rehabilitation	11 miles
Pre-Existing Road Obliteration	1.2 miles
Ephemeral Drainage Crossing Rehabilitation	28
Spring Restoration	0.2 acres
Contour Felling of Erosion Control Trees	188 acres
Aerial Grass Seeding of Intensely Burned Areas	468 acres
Chemical Treatment of Noxious Weeds	20 acres
Chemical Dust abatement Treatment of Access Roads	19.5 miles
Existing Road Upgrade	0.25 miles
Riparian Aspen/Shrub Replanting	20 acres
Off-Road Motorized Access Closure	1246 acres
Pastures Rested Post-Burn	4
Shrub Plantings within Burn Area (For Species see Appendix B)	20 acres

Erosion Control Structures within Stream	4
Firewood Cutting Closure	1246 acres
Fence Replacement	6 miles

2.5.2 Harvest (Salvage and Green Tree Thinning)

1. Harvest activities would occur between December 1 and March 31, and meet either of the following conditions: 1) occur over 4-6 inches of frozen ground and a minimum of 10 inches of snow; or, 2) if a No Effect determination for cultural resources is made in this area, ground disturbance would be limited to 20 percent of the areas entered for timber harvest. These actions would limit ground disturbance from harvest activities.
2. All trees with identified raptor nests would be retained.
3. Seasonal restrictions on harvest for wildlife species. (See specifics in Appendix C – Wildlife Report).
4. When snags are felled for safety concerns an alternate snag would be retained.
5. Where possible maximize the use of existing roads and trails for decking/landing areas to limit disturbance in the area.
6. No firewood cutting within burned area for 10 years, slash at decking and landing areas may be opened for cleanup through firewood cutting of already felled and left timber. This would promote snag retention in the area.
7. Existing log decks are included in harvest and would be removed.
8. Snags would be left in a combination of pockets and scattered spacing. In intensely burned areas snag numbers would equal 150 percent of the high end of natural variability (see Appendix c – Wildlife Report)
9. Retain 100 foot buffer on 75 percent of undisturbed, unburned rock outcroppings, a rock outcrop is an area of exposed rock with a very steep to vertical slope that is >=10 feet high.
10. Green trees would be yarded whole and slash piled at landings to be burned upon completion of harvest to minimize slash loads in the harvest areas.
11. No replanting of tree species in unburned areas.
12. Upon completion of log hauling and contracted road use, all newly constructed roads and dozer lines as a result of fire suppression activities or timber harvest alternatives would be obliterated, re-contoured, ripped, water barred and seeded with winter wheat and native and desirable non-native perennial bunchgrass seed.
13. All skid trails would be at least 100 feet apart.
14. Upgrade Dick Creek and Franks Creek road as needed for haul route, from landings to connection to Highways 19 and 26. This includes additional rocking, ditch cleaning, and culvert replacement.
15. A dead tree is defined as one having <=30 percent live crown remaining.
16. Harvest method types are designated based on topography and slope (see Table 1 and Map – Harvest Unit Areas for BLM Lands – Alternatives B, C and D)

17. All intensely burned areas (see Map – Harvest Unit Areas for BLM Lands – Alternatives B, C and D) would be open for harvest activities.
18. Haul activities would be restricted to July 1 to March 31 on the Franks Creek road to prevent dust transfer from the road into the stream and protect steelhead eggs that may still be in the gravel and not yet hatched.

Table 3 describes actions, which are common to all alternatives (alternatives B, C & D) and their associated measures.

Table 3 Actions Common to All Alternatives

Actions	**Common To All Harvest Alternatives**
Harvest Timeframe	Dec. 1 – March 31
Haul Timeframes	July 1 – March 31
Haul Route Upgrade	20.25 miles
Snag Levels within Intensely Burned Areas	150 percent of High End Variability

2.6 Comparison of Alternatives

All of the action alternatives would promote the recovery of soils and wildlife habitats in the area through active management of vegetation recovery, road obliteration, erosion control structures and an area closure. Each action alternative also would address the recovery of the economic value of the burned timber. The total amount of harvestable timber would differ between the alternatives based on specific design criteria such as buffer widths and age class distinctions. Alternative B addresses each objective and would focus on the burned areas, only harvest of dead trees would occur, all resources would be given adequate protection. New road construction would occur to access several areas. Alternative C addresses each objective and would focus on capturing the economic value of the dead timber and promoting forest health in overstocked areas by harvest of green trees to decrease stand stress. Alternative D addresses each objective and would focus on minimizing ground disturbance as much as possible by promoting in road decking and no new road construction. It also would provide the greatest protection for resources such as wildlife and water quality. The following table (Table 4) tracks the objectives described in Chapter 1 – Purpose and Need and how specific actions relate to those objectives.

Table 4. Comparison of Alternatives.

Objective & Resource	Alternative B	Alternative C	Alternative D
Soil			
Stream Buffers	100 feet	50 feet	100 feet
Roads Created	1.5 miles	1.5 miles	0 miles
Road Closures	1.2 miles	1.2 miles	1.7 miles
Acres Treated	823	905	723
Wildlife			
Snags Retained Non-Intense Areas	100 percent high end	100 percent low end	100 percent high end

Spring Buffers	100 feet	200 feet	300 feet
Road Closures	0 miles	0 miles	0.5 miles
Economic Value			
Harvest Volume	4.4 mmbf	6.9 mmbf	3.5 mmbf
Low Net Sale Value ($)	880,000	1,380,000	700,000
High Net Sale Value ($)	1,320,000	2,070,000	1,050,000
Jobs Maintained	100	157	80
Forest Health			
Green Tree Treatment	0 acres	145 acres	100 acres
Reforestation	474	474	474
Potential for Insect Infestation (relative)	Moderate	Low	High

2.6.1 Alternative B

This alternative would promote the recovery of the soils resource and wildlife values while allowing for harvest of dead timber within the area. Additional roads would be created and then obliterated upon completion of harvest. This would increase soil erosion and compaction concerns in these areas for a short time, rehabilitation by obliteration of these areas would decrease these concerns. It treats 823 acres and would amount to $ 880,00 - $ 1,320,000 dollars of revenue as measured by the income to the government. A riparian buffer, larger than PACFISH standards, would serve to protect drainages but would also decrease available timber volume.

1. Retain 100 foot buffers on all streams and springs.
2. Snags in non-intensely burned areas would equal 100 percent of the high-end natural variability (see Appendix C – Wildlife Report).
3. All downed logs in intensely burned areas would remain.
4. Harvest of 'dead' trees outside on intensely burned areas (See Map – Harvest Unit Areas on BLM Lands – Alternatives B, C, and D) would occur with the following considerations: without complete inventory of area and based on topical on-the-ground inspection, approximately 40 percent of the remaining burn area outside of intensely burned areas actually resulted in tree mortality. Therefore at most 40 percent of the non-intensely burned areas have the potential for harvest entry. Harvest entry into these areas would be subject to the following criteria: either 1) 4-6 inches of frozen ground and 10 inches of snow; or 2) without snow and frozen ground a maximum of 20 percent mechanical disturbance to harvested area limit is imposed. There would be no skidding through unburned, untreated tree stands. In either case a minimum of 1-acre size parcel would be accessed, areas small than 1 acre would remain.

2.6.2 Alternative C

This alternative promotes the recovery of the soils resource and wildlife values while allowing for harvest of dead timber and specific areas of green tree thinning within the area. Additional roads would be created and then obliterated upon completion of harvest. This would increase soil erosion and compaction concerns in these areas for a short time, rehabilitation via obliteration of these areas would decrease these concerns. Green tree thinning would include approximately 100 acres of >=70 percent canopy closure areas and harvest would occur within all age classes. This alternative treats 905 acres and would amount to $ 1,380,000 - $ 2,070,000 dollars of revenue as measured by income to the government. This alternative maximizes the net timber volume from the area in comparison to the other alternatives. Specific criteria for downed logs in non-intensely burned and green tree thinning areas would be met. A riparian buffer consistent with PACFISH standards would serve to protect drainages but would also maximize available timber volume.

1. 50 foot buffers on all streams, 200 foot buffers on all springs.
2. Snags in non-intensely burned areas would equal 100 percent of the low-end natural variability (see Appendix C – Wildlife Report).
3. All downed logs in intensely burned areas would remain. In non-intensely burned areas a minimum of 300 linear feet of log would remain in the >=12 inch dbh size class including 40 percent of these logs in the >=20 inch size class.
4. Harvest of dead trees in non-intensely burned areas is that same as Alternative B.
5. Harvest evenly within all size classes >=9 inch DBH in areas of 70 percent canopy closure, with an average 30-36 foot spacing for live trees, leaving a minimum of 3 trees per acre >=21 inch DBH
6. Retain 5 percent of all unburned thicket areas (areas of dense commercial and precommercial size under story)
7. Precommercial thin in stands with large tree component and dense seedling/sapling areas take trees <=9 inches DBH leaving a variable live tree spacing averaging 16-20 foot, a mixture of hand piling slash and burning (1 pile per acre) or lob and scatter methods would be incorporated to dispose of slash – applied only to >=70 percent canopy closure areas
8. Commercial thin trees >=9 inches DBH in areas exhibiting >=70 percent canopy closure leaving a basal area target of 60.

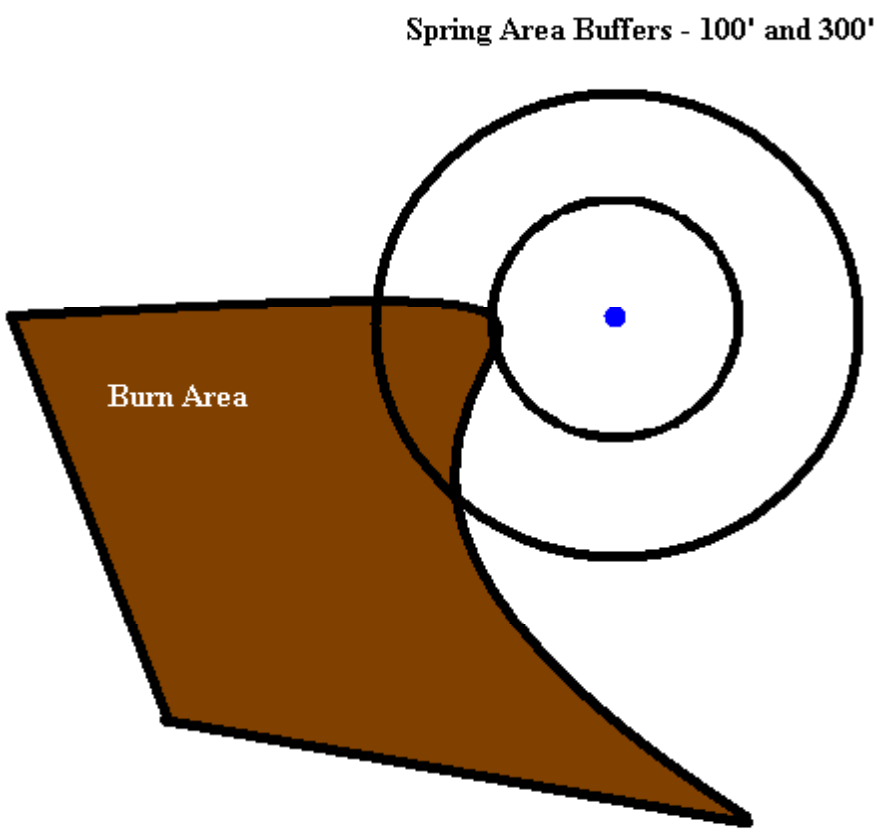
2.6.3 Alternative D

This alternative promotes the recovery of the soils resource and wildlife values while allowing for harvest of dead timber and specific areas of green tree thinning within the area. No additional roads would be created, all harvest would utilize the existing road and dozer line network. Green tree thinning would include approximately 100 acres of even-

aged stands with >=40 percent canopy closure, and harvest would not include any trees >=21 inches dbh. The large tree component as well as the large snag component would be promoted in this alternative. This action benefits certain cavity nesting species that may occur within the area. This alternative treats 723 acres and would amount to $ 700,000 - $ 1050,000 dollars of revenue as measured by income to the government. This alternative minimizes the net timber volume from the area in comparison to the other alternatives. All downed logs across the project area would be retained. A riparian buffer, larger than PACFISH standards would serve to further protect drainages but would also decrease available timber volume.

1. 100 foot buffers on all streams, 300-foot buffers on all unburned springs that includes all non-intensely burned areas, with a 100-foot absolute no entry buffer. (See Figure 1).

Figure 1. – The 300-foot buffers would not include any of the burn areas as shown.



2.Snags in non-intensely burned areas would equal 100 percent of the high end natural variability (see Appendix C – Wildlife Report)
3.Downed logs in intense and non-intense burn areas would remain.

4.Harvest of 'dead' tree areas outside of intensely burned areas (See Map – Harvest Unit Areas for BLM Lands – Alternatives B, C and D) would occur only when those areas are adjacent to intensely burned areas or
unburned treatment areas. Salvage areas would be a minimum of 1 acre in size. All snag prescriptions and harvest stipulations as described earlier for intensely burned areas in this alternative would apply.

5. No harvest of >=21 inches DBH component

6. Retain 5 percent of all unburned thicket areas (areas of dense commercial and pre-commercial size under story)

7. Pre-commercial thin in stands with large tree component and dense seedling/sapling areas take trees <=9 inches DBH leaving a variable live tree spacing averaging 16-20 foot, a mixture of hand piling slash and burning (1 pile per acre) or lob and scatter methods would be incorporated to dispose of slash

8. Commercial thin under story – trees >=9 inches DBH and <=21 inches in even aged stands exhibiting >=40 percent canopy closure leaving a basal area target of 60. All multi-layered canopy areas of mixed conifers would remain undisturbed.

9. Close permanently by obliteration two 2-track, non-major access roads one each in section 20 (along northern rim to the west) and Section 30 (off main Franks Creek public road) to motorized traffic within the burned area. See Map – Road Treatments – Alternatives D.

2.7 Monitoring

The interdisciplinary team would monitor the progress and completion of this project. Specific actions related to each of the objectives outlined in Chapter 1 – Purpose and Need would be monitored for compliance and effectiveness.

1. Reduce soil erosion due to wildfire and suppression disturbance.

   Compliance: 1) Assess use of closed roads and dozer lines before and after hunting season (high-use season).
   2) The contract officer would monitor daily during harvest activities to insure adherence to 20 percent ground disturbance maximum in ground-based harvesting areas.

   Effectiveness: 1) Debris jams within the stream as a result of suppression activities would be inventoried and assessed yearly after spring run-off to measure amount of sediment trapped in-stream.
   2) A reference reach would be established as described by the General Technical Report RM-245 Stream Channel Reference Sites. This reference reach

would be monitored yearly for a period of three years, post-harvest activities, to assess the stream and watershed response to management.

2. Recover wildlife habitat.

   Compliance: 1) Monitor the seasonal restrictions for heavy equipment operation for both harvest and hauling activities.

   Effectiveness: 1) Monitor yearly for five years the survival rate of seedlings and shrubs planted within the burned areas.
   2) Assess, post-harvest, the number of snags remaining in area.

3. Recover the economic value of the burned timber.

   Compliance: 1) The harvest figures in contract officer log records and EA would be compared to determine if the described actions occurred.

   Effectiveness: 1) The receipts from harvest would be evaluated in comparison to projected numbers assessed in the EA.

4. Maximize the re-establishment of a healthy forest ecosystem.

   Compliance: 1) Actual acreages treated would be measured and compared to numbers projected in EA.

   Effectiveness: 1) Continued monitoring of the previously established vegetation plot, which has been monitored as described in the Sampling Vegetation Attributes Technical Reference. This plot was established in 1993, and is normally monitored once every five years. The plot would be monitored every year for three years beginning in Spring of 2002.

3. Existing Environment

The area, as the name suggests, is somewhat of a "basin" draining into Franks Creek (some drainage to the west in Dick Creek). Elevations range from about 4,500 feet to over 5,000 feet with moderate to steep slopes. Soils have a high clay/ash content but also significant rock on the surface in several places. The pre-burn character of the vegetation was basically ponderosa pine and mixed conifer forest on all aspects. Riparian areas exist in a few seepy areas and along Franks Creek. Open meadows can be found mixed within the conifers. The area appears to have been impacted through past forestry practices (approximately 100 acres of harvest mostly on the north rim), livestock grazing (there are four pastures associated with the area) and other activities.

The Timber Basin wildfire burned in the upper headwater areas of Franks Creek, Ferris Creek and Dick Creek, approximately 10 miles north of Dayville, Oregon (Table 5). The watersheds discussed in this analysis are "pure" watersheds rather than delineated 5th or 6th field watersheds, i.e. the effected watershed headwaters were named by the name of the stream it supplies where it enters the John Day. This method was chosen rather than 5th or 6th fields due to the fact that the project area is in the headwaters of several drainages and flow of sediment is traceable downstream to the John Day through each specific stream. None of the streams in the analysis area is capable of producing fish, and is far upstream of the range of anadromous fish.

Table 5. Total watershed area and percent burned.

Watershed Name	Total Area (acres)	Area Burned
Franks Creek	16796	8.1%
Ferris Creek	5518	11.9%
Dicks Creek	5932	6.4%

The wildfire perimeter includes portions of Section 19, 20, 29, 30 & 31 in Township 11 south, Range 27 east, and portions of sections 25 & 36 in Township 11 south, Range 26 east. The fire burned during late August 2001 and was part of the Monument Complex. Suppression efforts for this fire were under the jurisdiction of the Oregon Department of Forestry. In addition the BLM provided Resource Advisors for this area during the wildfire.

The fire burned in various intensities across the area ranging from complete stand-replacement type burn areas to under-burn with periodic crown torching to areas of under-burn or no burn. The fire boundary includes approximately 2105 total acres, 1246 of which are located on BLM managed lands. The BLM maintains the Franks Creek road for public access and resource management activities. Approximately 3.6 miles of the road bisects the burn area.
Prior to the fire the stand was moderately healthy (mistletoe and pine beetle damage was present). The stand was overstocked with species of all size classes. Grand fir encroachment existed, particularly in the draw bottoms, along Franks Creek. As a result,

the older ponderosa pine and Douglas fir growth and vigor were stagnated. The combination of overcrowding, young grand fir and Douglas fir encroachment due to the exclusion of fire and forest vegetation stocking control treatments (i.e. pre-commercial and commercial thinning), and heavy slash loads made this stand susceptible to drought, insect induced tree mortality, and catastrophic wild fire.

Since the fire, the stand has lost 40-50% of the over story and the under story. Mortality is variable throughout the stand. Some hot spots exist where 100% of the vegetation is dead (approximately 25% of the area). Some areas were moderately scorched where 30-70% of the vegetation has been killed and some areas were lightly scorched where less than 30% of the vegetation has been killed.

4. Analysis of Effects

4.1 Soils

4.1.1 Alternative A

No additional erosion control measures other than what is existing now would be applied to the 11 miles of dozer line. No additional erosion control would be applied to the burned slopes. A 67 percent chance of erosion and sediment delivery would be present the 1st year and a 63 percent chance for erosion the second year assuming native grass like vegetation (elk sedge, needle grasses) is able to recover. The amount of erosion and sedimentation would depend on the intensity of the precipitation events. The 1.2 miles of road opened up along the Franks Creek riparian area would not be closed. This road has potential to erode and add excess sediment to Franks Creek. This road also allows access to newly constructed dozer line created during fire suppression. Increased ATV use could increase the amount of erosion on these trails and increase the overall compaction to the area. Improvements to the existing road system would not occur at this time.

4.1.2 Alternative B

This alternative provides the maximum amount of erosion control to reduce erosion and sedimentation effects. Fire suppression dozer lines would be reclaimed using the "standards for rehabilitation of cat lines" as identified in the Interagency Burn Area Emergency Stabilization and Rehabilitation Handbook (USFWS 2001). This would restore productivity to these lines and eliminate long term erosion effects on these dozer lines. Road improvements to the upper part of the Dick creek road would occur. This improvement would harden the road surface and decrease the amount of erosion that is presently occurring on this natural surface road segment. Contour felling would happen on 188 acres of burned slopes that are between 30 and 60 percent slope. Contour felling would help to beak up concentrated flows and increase the hydraulic roughness of the burned areas. Aerial grass seeding would be performed on 468 burned acres to provide a quick vegetative cover to hold topsoil in place and reduce the amount of sediment movement. The amount of erosion is still dependent upon the intensity of precipitation events. The 1.2 miles of newly opened road along Franks Creek would be closed to vehicle traffic and obliterated. This would reduce the effects that concentrated flow erosion would have along this road into the Franks creek drainage. This road obliteration would also allow an improved environment for vegetative plant growth (grass, shrubs and trees). Compaction due to increased vehicle use would also be reduced due to this closure and obliteration. Intermittent Drainage channels across this road would be restored to provide unimpeded flow into Franks creek.

For ground based yarding the forest service regional soil guidelines for ground based yarding are being used to keep the disturbance at less than 20 percent of the yarding area. The Timber Basin tractor yarding area totals 333 acres. There are

10.5 miles of existing roads and trails in this yarding area plus 7 acres of new landings constructed. An 11-ft average trail width would give 14 acres of impacted road area plus 7 acres for the landings would give 21 acres per 333 acres for the tractor yarding area, or a 6.3 percent of area impacted. Any additional skid trail impact would add to the 6.3 percent. A 100-foot distance between skid trails (disturbed areas) including the existing roads and trails (assuming a 10-ft width) would keep within the 20 percent guideline. It is proposed to log when the soil is frozen and with a snow cover to further reduce impacts from compaction.

This harvest activity would add about 1.5 miles of new truck haul road to access approximately 7 skid trail landings. To mitigate the impacts with these haul roads, it is proposed to build them on ground with slopes less than 35 percent to reduce cut slope disturbance. After harvest activities, these roads would be tilled (de-compact the road subgrade) and re-contoured (place fill slope material into the cutslope) to the pre-existing slope. Slash and organic debris would be pulled back over the road and planted with native trees and/or seeded with native shrubs and grasses.

4.1.3 Alternative C

This alternative maximizes impacts to the soil resource in that it affects more acres and proposes 1.5 miles of new road to be obliterated.

Same as Alternative B with the following addition:

This alternative proposes entry into approximately 100 acres of green tree thinning areas. Soil impacts would also occur in these areas due to ground based skidding.

4.1.4 Alternative D

Same as Alternative B with the following additions:

This alternative proposes ground based dead tree salvage and green tree thinning, harvest activity on approximately 333 acres. Helicopter yarding would occur on 459 acres to thin green trees and salvage dead trees. Impact to the soil resource is minimal with helicopter yarding. Landings would have to be constructed. Existing roads could be substituted as landings to reduce the area of new landing disturbance. This alternative could increase the soil disturbance level up to 20 percent of the ground based harvest area. Landings if compacted would be tilled; slash and organic debris scattered over surface and planted with trees. It is proposed to harvest this area when the soil is frozen with a snow cover. This would help minimize soil disturbance and compaction impacts from harvest activities. It is recommended to keep skid trails at about 100 feet apart to keep skidding disturbances to less than 20 percent of the ground based harvest area. The existing roads and make up a disturbance level of 6.3 percent of the proposed tractor harvest area. This alternative also proposes to upgrade the 20.25 miles of existing road accessing timber basin along Franks and Dick creeks. If ditch

cleaning is performed it is recommended to seed and mulch with a native grass mixture to control ditch line erosion. Road surfacing would be improved.

4.1.5 Cumulative Effects

The land ownership pattern and potential for harvest on private lands would increase the potential for soil loss and reduced productivity in the area. New roads created for harvest access on private lands would not likely be obliterated and would increase the amount of sediment originating from roads in the area.

4.2 Hydrology

4.2.1 Alternative A

On a watershed scale, when the fire removed coniferous vegetation in the Timber Basin burn, it reduced the transpiration component of the water balance equation. Although none of the springs burned, the increase in water yield may express itself in increased flow from the springs. Natural recovery of forest vegetation within the fire area would continue at a slow pace, so evapo-transpiration and precipitation interception would be far below pre-fire levels. The reduced canopy cover would allow more solar radiation and higher air temperatures to ripen the snow pack more quickly. As a result, peak discharge may occur earlier in the spring.

Forested and heavily vegetated drainage basins usually produce floods of smaller peaks and longer durations than comparable bare basins. In the time between the fire's removal of the forest vegetation and the adequate regeneration of forest vegetation, more water will be available for runoff. This may have the effect of increasing peak flows. These effects are expected to be minimal in the Dick Creek and Ferris Creek watersheds. The portion of Dick Creek within the burn area exhibits relatively flat topography, and the intensely burned area is minimal in the Ferris Creek watershed. However, the burned portions of Franks Creek Watershed are steep exposed slopes which funnel down into small a small pour point near the project boundary. Peak flows are generally less intense in round watersheds than in long narrow ones. Therefore, the discharge from this upper basin of Franks Creek may experience an increase in peak flows.

Fire suppression activities significantly increased the road densities of the Franks Creek, Dick Creek, and Ferris Creek Watersheds. Road densities increase the drainage network. This increase in the drainage network results in increases in the sediment supplied to the stream. Increases in the drainage network and sediment yield may result in increases in stream channel widths and excessive deposition. (Duncan and others, 1987) (Dose and Roper, 1994) (Harr et al. 1975) (Harr et al. 1979). Alternative A would result in leaving the greatest road densities in every watershed.

In this alternative, the road paralleling Franks Creek in Timber Basin would continue to contribute sediment to Franks Creek. This road crosses three intermittent drainages close to their confluence with the main stem of Franks Creek. These road crossings decrease the function of the channel bottom by altering the geomorphology of the historic valley bottom. These road crossings are also pour points for flow carrying sediment down ruts in the roads. The sediment is directly deposited in the stream channel. Where the Franks Creek road is located in close proximity to the channel (approximately 100 feet) it will continue to contribute sediment to the Franks Creek channel. This road also allows access to newly constructed dozer lines created during fire suppression. Increased ATV use could increase the compaction and trails in the area, which would in turn, increase the drainage network.

4.2.2 Alternative B

Obliterating by re-contouring and reseeding all dozer lines will reduce the risk of erosion from high intensity summer thunderstorms or rapid spring melt. Where dozer lines cross ephemeral draws this would reduce the likelihood that the drainage network would extend up the dozer lines. Reconstructing the channel at dozer line crossings will to prevent the stream network from extending up the roadbed or dozer line.

The road along Franks Creek currently has the potential to contribute more than a ton of sediment to the stream per year. Alternative B would eventually eliminate this effect by closing and obliterating the road. This road crosses three intermittent drainages close to their confluence with the main stem of Franks Creek. Restoring these channel crossings would increase the function of the channel bottom by restoring the geomorphology of the historic valley bottom. These road crossings are also pour points for flow carrying sediment down ruts in the roads. Eliminating these road crossings disable them from directly depositing sediment in the stream channel.

Where the Franks Creek road obliteration is located in close proximity to the channel (approximately 100 feet) it will reduce contribution of sediment to the Franks Creek channel. The obliteration of this length of road reduces the overall road densities in the Franks Creek Watershed. Closing this road will also restrict recreation access to newly constructed dozer lines created during fire suppression.

Replacing the culvert on private land along Franks Creek would reduce sediment delivered to the channel at the road crossing and provide an opportunity to affect the channel geometry at the head cut upstream. Although the rust-line on the culvert on the main public access route indicates that the size is adequate, the increased peak flows anticipated out of the Franks Creek Watershed necessitates a larger culvert at this site. An under-sized culvert could result in excess sediment supplied to the stream from road blow-outs and excess erosion.

Improving the hydrologic function of the Dick Creek road will reduce sediment delivered to the drainage network, and minimize erosion of slopes adjacent to the road. Monitoring the heavy equipment activities associated with improving the road can ensure that grading and adding gravel material to the road where needed will not increase the quantity of sediment available for erosion to the stream channels.

Current public use levels and use associated with residential homes justify the presence of the Dick Creek road. However, if future management objective created the need to close this road it would be more difficult to restore to natural vegetation than a less used natural surface road.

Reducing off-road motorized access will prevent increases in road densities throughout the project area. Closing the burn area to off-road vehicle use may also improve the success of riparian and erosion control planting by eliminating the possibility that vehicle will inadvertently kill newly established vegetation. Closing the entire area to firewood cutting for ten years in burn boundary would have similar effects as off road vehicle closure, for a ten year duration.

Conducting aerial seeding of intensely burned areas will expedite the re-growth of grasses. These grasses will intercept water droplets and decrease their potential energy and erosive power. As the grasses grow, infiltration and evapo-transpiration will increase. Contour falling up to 5 percent of 'dead' trees will reduce surface rilling on the steep slopes. Controlling erosion throughout the watershed maintains natural erosional patterns and results in healthy stream channels.

Hydro-mulching in site-specific areas of heavy erosion potential associated with dozer lines and roads provides seeds with a better chance of survival and ensures that these high risk areas are stabilized against erosion.

Rehabilitating spring sites improve their ability to filter sediment from overland flow and increase the overall riparian area throughout the project area. Off site watering will protect the re-vegetated areas when grazing resumes in this area. In addition, off site water will also protect the quality of water produced by the spring and delivered to Franks Creek.

Noxious weeds impart interception, transpiration, infiltration, and erosion patterns to watersheds that are not consistent with those patterns imparted by the natural vegetation. This alters the overall channel geometry, bedload, and flow regimes away from the natural potential from which the surrounding ecology developed. Therefore, reducing the cover of noxious weeds in a watershed will benefit hydrologic and ecological resources.

Lack of a pre-settlement fire regime and the resulting closed canopy over the Franks Creek main channel may explain the absence of aspen as well as the minimal quantity of riparian shrubs. Aspen plant communities have been characterized in Mid-Montane Wetland Plant Associations of the Malheur, Umatilla and Wallowa-Whitman National Forests. Several of the quaking aspen plant community type descriptions would be expected in the headwater basin of Franks Creek which is included in the project area. The dense canopy cover of conifers adjacent to, and in the flood plane of the B4 reach of Franks Creek may have crowded out any historical quaking aspen plant communities.

Removal of vegetation can destablize marginally stable slopes by increasing the subsurface water load, lowering root strength, and altering water flow patterns in the slope. Common snowberry responds moderately well after logging depending on site characteristics. Seven years after logging in ponderosa pine in eastern Washington and Oregon, common snowberry had increased its coverage by 30 percent over its prelogging coverage. It can be expected to increase in cover and form low thickets following logging and may provide shade to conifer seedlings during their early growth (USDA FS 2001a).

The actual removal of dead standing trees would not increase erosion. The dead timber has very little value in the interception and evapo-transpiration of precipitation because it lacks foliage. The stabilizing effect of the tree roots was reduced by the fire, but would not be additionally impacted by removal of the above ground trunk.(USDA FS 2001b).

In general, ground-based skidding causes the greatest immediate soil effect, followed by skidding over snow, skyline, and helicopter retrieval (Klock 1975). Although this study site is not exactly the same as Timber Basin, it is the most comprehensive study of the effects of logging systems. The caps of ash soils and vegetation types are similar.

Limiting the disturbance levels to 20 percent within the small areas entered for logging will limit effects of extending the drainage network. The use of existing dozer lines should also limit the effects of extending the drainage network, by reducing the need for new roads. Increases in the drainage network and sediment yield may result in increases in stream channel widths and excessive deposition. (Duncan and others, 1987) (Dose and Roper, 1994) (Harr et al. 1975) (Harr et al. 1979.

Utilizing the existing roads and trails will increase the ability of the Contracting Officer's Representative to measure increases in percent disturbance towards the 20 percent threshold. Minimizing ground disturbance maintains the cohesive function of the forest floor vegetation, litter, and soil layers. Together, these layers have a sponge-like ablility to intercept moisture and either retain it on the landscape or expedite it's infiltration. Ground disturbance can also disrupt subsurface flow patterns.

Yarding green trees whole and burning the slash piles will remove ground cover and stored nutrients from the site. However, removing the potential fuels from the site may reduce the risk of catastrophic wild fire in the near future. A catastrophic fire in the area in the next few years would not allow sufficient time for the streams to recover after the Timber Basin Fire.

Obliterating newly constructed roads and dozer lines and restoring vegetation on the newly constructed roads and dozer lines will reduce road densities. It will also return infiltration, interception, overland flow patterns, and evapo-transpiration rates to those naturally expressed across the mosaic of each watershed. Water barring will convert roads to levels of self-containing drainage (USDA FS 1997) and redirect flow patterns on the roads to the adjacent vegetation. This filters sediment before water reaches stream channels, reduces the erosive power of the water, and returns the water to a more natural drainage network.

Maintaining a 100 foot distance between skid trails would limit the effects of extending the drainage network, by reducing the need for new roads. Increases in the drainage network and sediment yield may result in increases in stream channel widths and excessive deposition. (Duncan and others, 1987) (Dose and Roper, 1994) (Harr et al. 1975) (Harr et al. 1979. In addition, this will limit the surface area transformed to skid trails. Skid trails pose the risk of compacting soils and temporarily diverting water runoff into the area of disturbance. Logging over snow would greatly reduce this risk.

4.2.3 Alternative C

Same as Alternative B with the following additions:

Alternative C contains the most ground based yarding acres of all the harvest alternatives - ground based yarding is generally the most disruptive to watershed and, eventually, stream channel function.

On a watershed scale, when harvest removes coniferous vegetation at the Timber Basin burn it would reduce the transpiration component of the water balance equation. Although none of the conifers near springs would be harvested, the increase in water yield may express itself in increased flow from the springs. Evapo-transporation and precipitation interception would be below pre-fire levels. The reduced canopy cover would allow more solar radiation and higher air temperatures to ripen the snow pack more quickly. As a result, peak discharge may occur earlier in the spring.

Forested and heavily vegetated drainage basins usually produce floods of smaller peaks and longer durations than comparable bare basins. Between the harvest removal of the forest vegetation and the adequate regeneration of planted forest vegetation, more water would be available for runoff. This may have the effect of increasing peak flows.

The leaving pre-existing road in Section 30 open would enable the road to continue altering the function of that watershed and stream channel by confining its location and contributing sediment.

4.2.4 Alternative D

The road closure and obliteration of the road in Section 30 is included in this alternative. This road is located in the steep headwaters of the Ferris Creek Watershed, and crosses an intermittent or ephemeral stream on BLM. The road gradient is around 8 percent from the main Franks Creek Road for half a mile down to where it crosses a stream channel. It is expected that the road crossing is widening the channel and contributing sediment to the channel. Without appropriate drainage dips and design this long, steep length of road can develop ruts, extend the drainage network, and deliver sediment to the channel. While improvements to the drainage structure would reduce impacts to the watershed and drainage network, the reductions would be less than those realized by obliterating the road.

Using the WEPP tool, the contribution of the section 30 road to the ephemeral channel it crosses is 8.5 tons of sediment per year. Improving the drainage characteristics of the road could eliminate rutting. Then the annual sediment yield to the stream could be reduced to more than one ton per year. Alternative D is the only alternative that would obliterate and thus eventually eliminate the sediment currently being supplied to the stream channel.

4.2.5 Cumulative Effects

The potential for harvest on adjacent private lands without the reclamation and obliteration of roads and skid trails would increase water quality concerns in the area (i.e. peak discharge and timing).

4.3 Silvicultural Resources

4.3.1 Alternative A

No planting would take place and the stand would be left to recover to forest trees naturally. The wildfire left portions of this stand practically denuded. Such land

has little chance to reproduce naturally in the short term. A full stand of seedlings would usually come gradually over a period of 20-25 years (Westveld, 1947).

All dead trees left on site would result in a very hazardous site and would result in extremely heavy slash loads for the short and the long term. Slash loads would exceed 30-40 tons per acre. The John Day RMP suggests a limit of 12-15 tons per acre (USDA-BLM 1985a). This would create a condition very susceptible to another catastrophic wildfire. In addition, insects would become established in the standing dead and stressed trees and susceptibility to an insect outbreak would be increased which would be detrimental to live trees left on the site, as well as to live trees left on neighboring private lands. The western pine beetle is a very damaging pest on ponderosa pine (the dominant tree species within the project area). Low vigor trees (especially those damaged by fire) are the most susceptible to attack and could serve as a source for infestation of adjacent green tree stands (Everett, 1995a).

No thinning of green tree thickets would take place and tree vigor on these sites would remain susceptible to competition resulting in continued stunted growth. If the Douglas fir beetle populations are locally high, or increase rapidly on the burn, not only would moderately-injured trees be increasingly attacked by bark beetles over the next couple of seasons after the fire, but lightly injured, and some uninjured host trees would be attacked and killed by beetles as well (Scott et al. 1996).

4.3.2 Alternative B

Upgrading and maintaining the Franks Creek and Dick Creek roads would make the routes safer for the public as well as for administrative and public users (USDI BLM 1985b)

A 100' buffer on the streams would remove approximately 48 acres from the potential harvest area. This would amount to approximately 192 thousand board feet (mbf) of dead material, a value of $38,400 – 57,600, that would not be salvaged.

Within the non-intensely burned areas, where approximately 40 percent of the tree vegetation have been scorched, bole damage and root damage could result in more tree mortality. The large diameter mature trees (e.g. over 150 years) are typically the ones that western pine beetle are attracted to when injured by fire (Miller and Keen, 1960). Western pine beetle is one of the most common bark beetles attracted to scorched ponderosa pine (Scott, 1999).

All of the burn studies (in ponderosa pine) agree on one point: The western pine beetle is not attracted to trees that have been immediately fire killed by the burning of all foliage, charring of the bark, and killing of the entire phloem area. The beetle selects trees that have survived the fire with enough green phloem and

live buds to permit new needle growth after recovery from the first shock of the fire. The studies also agree that there is a direct relationship between the amount of crown defoliation from fire and the selection by western pine beetle of these surviving trees (Miller & Keen 1960, Scott 1999).

Leaving 150 percent of the high end natural variability of snags based on Ochoco Viable Ecosystems Analysis in intensely burned areas of this site would create a long term fuel load that would be in excess of the John Day RMP recommended 12-15 tons per acre. Leaving 150 percent (an average of 18 snags per acre x 468 acres = 8,424 snags) would reduce the total volume removed from the intense burned areas by approximately 1516 mbf for a net economic value of $ 303,200.

If these snag and log densities are carried forward to the future forest there is the probability for fire events more severe than the event that just occurred. Natural processes of decay are unlikely to remove the current dead tree material before the next fire event (Everett, 1995a). In addition, dead trees attract a wide variety of bark beetle species (Amman &Ryan 1991, Salman 1934), which can build up large populations that serve as a source for infestation of adjacent green tree stands (USDA-FS 2000).

Fire behavior science suggests that potential for ignition, intensity of burn, and required suppression effort increases as fuel loading increases. Increased intensity of burn could decrease number of snags and logs remaining after reburn (Everett 1995a).

Retaining 100 percent of the high-end variability in the non-intensely burned areas (an average of 12 snags per acre x 311 acres = 3,732 snags), would reduce the total volume removed by approximately 672 mbf, an economic value of $134,000.

Leaving all downed logs within the project area could create some sites with excessive fuel loads. Maximum fuel loads for a project area are specified in the John Day RMP Record of Decision as 15 tons per acre. Any slash in excess of this would be removed as part of the project.

By maintaining the opportunity to create a limited amount of new temporary skid trails and roads, an approximate additional 100 acres or 400 mbf of material could be salvaged resulting in an additional economic recovery of $80,000 - $140,000. Approximately 1.2 miles new temporary spur roads would be needed for haul. Approximately 1.5 miles of temporary skid trails would be necessary. A total of approximately 14 landings are expected to be needed for this alternative.

All roads, skid trails and landings would be rehabilitated if new ground is disturbed. If snow is present, only temporary roads and landings should need rehabilitated. Skidding over snow, skid trails would not be expected to disturb new soil.

A 100' buffer on 15 springs would decrease the salvage area by approximately 11 acres for a net volume of 22 mbf of green material, a net value of $4,400 - $6,600.

4.3.3 Alternative C

Same as Alternative B with the following additions.

In addition to dead material salvage, additional green commercial thinned material would be harvested. On these 100 acres a total of approximately 600 mbf could be salvaged and commercially thinned for a economic recovery of $120,000 - $180,000.

A 200' buffer on 15 unburned spring areas in non-intense burn areas would constitute approximately 43 acres, 86 mbf at an economic value of $17,600 – 26,400, that would be forgone for the protection of these areas.

Retaining 100 percent of the low-end variability in non-intensely burned areas (an average of 12 snags per acre x 311 acres = 3,732 snags) would reduce the total volume removed by approximately 672 mbf for a net value of $ 134,400 – 201,600.

Leaving downed logs in the intensely burned areas would create an immediate slash load but it should be within the John Day RMP limit of 12-15 tons per acre.

Commercial thinning and harvesting all size classes >9" dbh would be in conformance with the John Day RMP and in conformance with sound silvicultural practices. However, this action would leave 3 large green trees per acre, which would reduce harvest by approximately 750 mbf and reduce the economic recovery value by approximately $225,000.

Commercial thin trees of all size classes >9" dbh in areas of 70 percent or greater canopy closure. This would include a net volume of approximately 1.5 mmbf, a net value gain of $200,000 - $300,000 to the federal government. In addition growth, vigor and health of the forest stand would improve by controlling large tree competition and thus allowing the younger more vigorous trees to.

Leaving all pre fire existing roads open would facilitate access for the administrative management of the small and large forest resources for both the BLM and for the adjacent landowners.

4.3.4 Alternative D

Same as Alternative B with the following additions:

Restricting the creation of new skid trails and spur roads would limit the number of acres that could be restored through salvage and thinning. Total acres not treated under this alternative for this reason would be approximately 100, which would yield a salvageable volume of approximately 400 thousand board feet (mbf) at a net value of $80,000 -$140,000.

The 300' buffer on unburned spring areas (approximately 15) would amount to approximately 97 acres or 194 mbf of green material that would not be commercially thinned an economic value of-$ 38,800 – 58,200.

Leaving trees that are >=21 inches in DBH with 10 percent or more live crown would result in approximately 2000 trees or 1.0 mmbf being left on site which would create a safety hazard in the area (USDI BLM 1985a). It would also create a situation where future slash loads could exceed 15 tons per acre (including other un-salvaged smaller trees) as these trees fall to the ground. Fifteen tons per acre is taken to be the upper limit for slash left on-site after timber harvest activity. The economic value of this salvageable material forgone would equal $200,000-$300,000.

By leaving all trees >21 inches dbh with a green crown of 10 percent, the heavily stressed trees would be left on-site. These are the first trees to be occupied by insects. Many of the insects attracted by fire killed trees are considered pests. Retaining the vulnerable trees can increase the probability that insect pest populations would build up and infest adjacent green tree stands (Salman, 1934, Scott et al. 1996, USDA-FS 2000).

BLM management of its forest resources is directed by the most recent adopted Resource Management Plan (USDI-BLM 1985b). The Timber Basin project area is identified as an area within the 30,962 acres of commercial forestland, which is available for full timber production (USDI-BLM 1985b). Eliminating the thinning of green trees >21" dbh would inhibit the growth potential of the younger more vigorous trees. The amount of acceleration in growth after cutting varies with the degree of release and with the size of the tree, gradually increasing with increase in diameter, up to 25 inches dbh, declining thereafter (Westveld 1947). In the Maury Watershed Analysis (1998), Prineville Ranger District, silviculturist Barb Fontaine recorded the growth rates of trees in several different ponderosa pine stands. The rate of growth of trees in un-thinned stands was 1.2 inches for a controlled time period. At this rate a 12" dbh tree would need 75 years to become a 21" dbh tree. The rate of growth in thinned stands, trees grew at a rate of 2.5 inches for the same controlled time period. At this rate a 12" dbh tree would become a 21" dbh tree in 36 years (Fontaine 2001).

In addition, the overcrowded trees in the un-thinned stands are much more at risk and susceptible to insects and disease.

For this alternative, no green tree harvest of >21" dbh component would reduce salvage and commercial thin efforts by approximately 1.5 mmbf and result in a net loss of $200,000 - $300,000 to the federal government.

Retaining 5 percent of the unburned thickets would inhibit the growth potential of all the green trees within these thicket areas. This would leave approximately 25 acres un-thinned. A volume of approximately 50 mbf valued at approximately $10,000 would be left in place.

Pre-commercial thinning trees <9" dbh would increase the vigor, health and growth potential of the remaining small diameter green trees. No commercial volume or value would be affected.

Within these green areas, if no disturbance occurs in the stands with multiple canopies, dominant pines would give way to Douglas fir and white fir, which would take over the site as the pines reach old age and die. Ponderosa pine grows slowly, especially in the eastern side of Oregon. A 60-year-old tree could reach 8" dbh in an un-thinned stand while it could reach 12" dbh in a thinned stand (Oregon Forest Resources Institute 1999). Commercial thinning only trees <21" dbh would, therefore, inhibit the growth potential of the stand as a whole.

Closing roads would not affect the forest resource. However, closure would decrease the efficiency of managing this resource because it would restrict access. These roads have been used in the past for forest operations traffic and for recreation traffic. The SW road (Section 30) off of Franks Creek road, has been recently used by private (with permit) for log hauling. One objective of the John Day RMP is to keep public lands and roads open for a variety of recreational uses (USDI-BLM 1985b).

4.3.5 Cumulative Effects

Insect impacts would be reduced due to salvage activities on private and public lands. Insects would kill additional trees; however, the timing and amount of harvest would reduce the risk of large-scale outbreaks.

4.4 Special Status Plants

4.4.1 Alternative A

The no action alternative would allow this species to recover at a natural rate, however, motorized access across the burned area may impact recovery of these species because of additional disturbance.

4.4.2 Alternative B

Salvage harvest/restoration of the Timber Basin fire is unlikely to have an effect on special status plants. However, the use of heavy equipment should be avoided in Franks Creek unless the area to be impacted does not contain riparian vegetation. If riparian vegetation would be involved, botanical field inventory of the exact project location should be performed prior to implementation, either this fall/winter to verify the area is not likely to support the aforementioned species, or next June if proper habitat is suspected. The use of heavy equipment on the rocky scabs should be avoided as well.

Should project implementation adversely affect any individual populations of the aforementioned species, it is not likely that these impacts would affect the species as a whole. Additionally, none of these species are federally listed.

4.4.3 Alternative C

Same as Alternative B.

4.4.4 Alternative D

Same as Alternative B.

4.5 Noxious Weeds

4.5.1 Alternative A

This alternative would allow all vegetation to recover at natural rates. Given the disturbance in the area and the prevalence of bare soil it is expected that noxious weeds would establish within some areas of the burn. Significant infestations could result in additional treatment for weed species in the future.

4.5.2 Alternative B

Disturbance from the fire and harvest activities could result in the spread and propagation of noxious weeds in the area. It is expected that approximately 20 acres of disturbed ground would need to be chemically treated for noxious weed control to eliminate the presence of weed species in the area.

4.5.3 Alternative C

Same as alternative B.

4.5.4 Alternative D

Same as alternative B.

4.5.5 Cumulative Effects

Disturbance in the area on private lands would increase the potential for noxious weed establishment, this could pose a concern for future infestations of noxious weeds and subsequent treatment on BLM lands.

4.6 Wildlife

When comparing effects of human induced change it is important to have a basic understanding of the natural processes and effects. Wildlife populations have and would continue to be affected mainly by the local climate, vegetation, topography, competition, predation, and disturbance factors. The effects of human induced change related to the silvicultural and other activities proposed in the alternatives would be measured against each other. Proposed actions associated with the alternatives would be viewed in the context of their potential for effects to the process and function related to wildlife habitat.

4.6.1 Large Structure Habitat

4.6.1.1 Alternative A

The No Action alternative would leave all large structure burned and unburned as it is now.

4.6.1.2 Alternative B

Restoration activities would decrease the time frame for stocking of the burned areas to become large structure stands.

Salvage activities would remove some of the large structure that would function as snags and down logs in the burned area. All alternatives leave 150 percent of the high end of historic range of variability for these plant associations within intensely burned areas. Removing high levels of dead material from the burned areas would reduce the potential for future high intensity burns that would further prolong the development towards large structure and would have the potential to further reduce large structure in the analysis area by burning remaining green stands with large structure.

4.6.1.3 Alternative C

Same as alternative B with the following additions:

Green harvest in the unburned areas under this alternative would further reduce the amount of large structure in the analysis area and watershed.

Increased compaction associated with tractor logging has the potential to reduce growth rates and prolong development of large structure.

4.6.1.4 Alternative D

Same as alternative B with the following additions:

Green harvest in unburned areas under this alternative would enhance growth potential of single story ponderosa pine stands. The large structure component that exists in these stands would remain after harvest. Stands would be commercially thinned to remove trees in the 9 – 18" dbh range to promote the growth of the largest trees available in the stand.

4.6.1.5 Cumulative Effects

Because of the existing situation on private land and the high likelihood of management practices that would exclude large structure on the surrounding lands the amount of large structure present in the analysis area becomes very important to a number of wildlife species such as the black-backed woodpecker. Action alternatives that propose building roads have the potential to break up the character of undisturbed habitats. All action alternatives would reduce the potential for catastrophic fire and insect epidemics. This would reduce the likelihood of further reductions in the amount of large tree structure.

Throughout much of the west unique habitats are being lost to conifer invasion. Lower in the Franks Creek Watershed intensive cattle grazing, logging, and road construction have cause head cutting in the streams and the loss of much of the riparian vegetation. Cut banks and intensive grazing are precluding the reestablishment of hardwood species important to neotropical migratory birds. The reduction ground litter from hardwood trees and reduced wetted width of stream channels has reduced potential habitat for amphibian species.

4.6.2 Riparian, Neotropical Migratory Birds and Amphibians

4.6.2.1 Alternative A

The dozer lines within riparian areas would not be rehabilitated, the potential exists for future disturbance to birds and amphibians from usage of these lines as access points for recreationists.

4.6.2.2 Alternative B

Restoration efforts would decrease the recovery time of the riparian areas in the analysis area. Restoration of riparian habitat would benefit a host of species including neotropical migratory birds and amphibian species. The development of the riparian shrub and hardwood communities is one of the big limiting factors to neotropical migratory bird habitat. Additional shrubs and hardwoods would benefit many wildlife species. Restoration activities would occur outside of critical reproductive periods for neotropical migratory birds and amphibian species (See Appendix C – Wildlife Report). Mechanical activities would be restricted to already disturbed areas. There is the potential that incidental individual amphibian species could be killed during restoration activities; however, this would not be significant enough to effect local populations survival.

Due to the intensity of the burn area there is very little structural diversity at this point for use by neotropical birds. Restoration activities would decrease the time to return these areas to a more diverse condition. Snags are a critical habitat component for some neotropical migratory birds. The burned areas have very little canopy cover remaining and most if not all down logs were consumed in the burn. Amphibian species utilizing the area before the burn would have been associated with microhabitats that retained higher moisture levels.

Salvage activities would not occur in the riparian areas.

4.6.2.3 Alternative C

Same as Alternative B with the following additions:

Green tree harvest would not occur in riparian areas. Silvicultural prescriptions for the thinning would leave small patches of dense fir trees for some species of birds that prefer thicket conditions. Large diameter trees and snags are important to several species of neotropical migratory birds.

This alternative would reduce the large tree component in unburned stands and would leave the fewest snags of all alternatives.

4.6.2.4 Alternative D

Same as Alternative C with the following additions:

This alternative would disturb additional acres of unburned habitat through harvest activities; however, the large tree component would be retained.

4.6.2.5 Cumulative Impacts

Project activities are expected to occur in the winter of the year when most species of amphibians are dormant.

4.6.3 Snags and Downed Logs

4.6.3.1 Alternative A

This component would remain in a very high concentration due to no harvest and maintenance of current on-the-ground conditions.

4.6.3.2 Alternative B

The restoration efforts should not reduce the amount of snags in the analysis area and would decrease the recovery time of timbered stands allowing for trees of sufficient size to provide snags sooner.

All harvest activities associated with salvage would leave 150 percent of the high end of historic range of variability. This would provide increased numbers of snags with potential to be used as source habitats for woodpeckers and subsequently for secondary cavity users. Because salvage activities would occur in areas where the majority of live trees were killed by the fire there would be a period of 100 – 200 years prior to sufficient size trees to provide large snags. Many of the snags (especially those in the smaller size classes) would fall to the ground within the next 10 years. When snags begin falling to the ground the amount of down wood would increase.

The "patchiness" of fire is a desirable characteristic, and many species depend on the environmental influences that fires create (Beschta, et. al. 1995). All alternatives prescribe that snags would be left in clumps and scattered throughout the units. All alternatives call for the number of snags to be left after harvest to be prescribed and then snags counted on the ground during marking to insure that sufficient snags exist in the units. Because of this method, the number of existing snags is not as important. If a unit is found to have insufficient snag or down log numbers during marking no snags would be removed.

4.6.3.3 Alternative C

Same as alternative B with the following additions:

This alternative proposes to harvest 150 acres of unburned areas with snag retention at the low end of historic range of variability (see Appendix C – Wildlife Report) and down log retention at the highest level prescribed by ICBEMP. Higher snag numbers than normal would exist in the burned

areas, and snag and down log numbers would be within but at the low end of historic levels in unburned harvest areas.

4.6.3.4 Alternative D

Same as alternative B with the following additions:

This alternative proposes to harvest 100 acres of unburned areas with snag retention at the high end of historic range of variability (see Appendix C – Wildlife Report). It also proposes to leave all down logs in green tree harvested areas. With the reduction of down wood in the analysis area due to the fire the remaining down wood becomes more important for a variety of species habitats including small mammal habitat and woodpecker foraging areas.

4.6.3.5 Cumulative Impacts

No plans exist to harvest additional areas on BLM lands in any of the effected watersheds. Harvest on adjacent private lands is expected to occur within the next two years. Snag and down log levels would be higher than prior to the burn on private lands that burned, however it is expected that the majority of these would be very small diameter and would likely fall within seven years. Surrounding habitats are predominantly juniper woodlands and shrub steppe. Habitats to the east do provide potential for ponderosa pine, western tamarack, and Douglas fir snags.

4.6.4 Big Game

4.6.4.1 Alternative A

The high road densities remaining after the fire suppression efforts would reduce the rate at which big game returns to these habitats.

4.6.4.2 Alternative B

The burn created large areas of high value big game foraging opportunities. Habitat security is an important factor, both cover and road density effect habitat security. Restoration efforts should enhance the conditions for big game through improving habitat security by closing mechanical fire lines, planting shrubs and riparian hardwoods, and re-vegetating burned areas.

Project activities associated with all alternatives would occur outside of critical reproductive activities, and the project area is too high of elevation to function as critical winter range habitat.

The burn reduced the amount of cover in the analysis area and watershed. Prior to the burn there were 523 acres of marginal cover 40 – 70 percent and 229 acres of optimal >70 percent. After the burn there are 313 acres of marginal and 119 acres of optimal.

Salvage activities if done with a tractor would create additional skid roads with the potential to be used by the public even after closure efforts.

This alternative would create 1.5 miles of additional roads in the area (all newly constructed roads would be closed, i.e. obliterated, after harvest) that could become used by the public as roads if road closures are not effective.

4.6.4.3 Alternative C

Same as Alternative B with the following additions:

Green tree harvest would further reduce cover values. This alternative would reduce cover values on 150 acres.

A minimum of 200 feet is required to provide hiding cover. This alternative provides hiding cover buffers of 200 feet around springs to provide security habitat associated with potential elk wallowing activities.

4.6.4.4 Alternative D

Same as alternative B with the following additions:

This alternative does not create any new roads; however, tractor logging would create skid trails that would still have the potential of being used as roads by the public. This alternative would close 1.0 mile of road that existed prior to the burn and would result in a road density of 2.04 m/m2 after project activities are complete.

Green tree harvest would further reduce cover values. This alternative would reduce cover values on 100 acres.

A minimum of 200 feet is required to provide hiding cover. This alternative would provide hiding cover buffers of 300 feet around springs to provide security habitat associated with potential elk wallowing activities.

4.6.4.5 Cumulative Impacts

Habitats in the remainder of the watershed are typically much more open than that contained in Timber Basin. The surrounding habitats are a mixture of BLM and private lands. Private lands typically receive less hunting pressure than public lands due to limited access.

Big game tag numbers in the area have gone down in the last several years.

In 1995 Havlick reviewed 802 road closure sites, of these only 27 percent fully closed the roads they were intended to close. If road closures within the analysis area are not successful habitat security would be reduced on terrestrial and riparian areas. The greater the miles of roads or mechanical fire line closed the greater the potential for public use at least on a portion of them.

4.6.5 Threatened, Endangered and Special Status Species

An analysis of effects to these species is included in the Wildlife Report (see Appendix C). The following table (Table 6) is a summary of the effects to these species.

TABLE 6 Summary of Conclusion of Effects to Listed and Special Status Species

	Wildlife	Listing	Alt. A	Alt. B	Alt. C	Alt. D
1	Northern bald eagle	threatened	NE	NE	NE	NE
2	Canada Lynx	threatened	NE	NLAA	NLAA	NLAA
3	Washington Ground Squirrel	federal candidate	NE	NE	NE	NE
4	Oregon Spotted Frog	federal candidate	NE	NE	NE	NE
5	Northern Goshawk	sensitive	NI	MIIH	MIIH	MIIH
6	Ferruginous Hawk	sensitive	NI	NI	NI	NI
7	American Perigrine Falcon	sensitive	NI	NI	NI	NI
8	Flammulated Owl (BM)	sensitive	NI	MIIH	MIIH	MIIH
9	White-headed Woodpecker	sensitive	NI	MIIH	MIIH	MIIH
10	Black-backed Woodpecker (BM)	sensitive	NI	MIIH	MIIH	MIIH
11	Three-Toed Woodpecker (BM)	sensitive	NI	NI	NI	NI
12	Pygmy Nuthatch (BM)	sensitive	NI	MIIH	MIIH	MIIH

13	Burrowing Owl	sensitive	NI	NI	NI	NI
14	Streaked Horned Lark	sensitive	NI	NI	NI	NI
15	Yellow-Billed Cuckoo	sensitive	NI	NI	NI	NI
16	Columbian Sharp-tailed Grouse	sensitive	NI	NI	NI	NI
17	Townsend's Big-eared Bat	sensitive	NI	MIIH	MIIH	MIIH
18	Fisher	sensitive	NI	MIIH	MIIH	MIIH
19	Upland Sandpiper	sensitive	NI	NI	NI	NI
20	Northern Pygmy owl (BM)	sensitive	NI	MIIH	MIIH	MIIH
21	Painted Turtle	sensitive	NI	NI	NI	NI
22	Western Pond Turtle	sensitive	NI	NI	NI	NI
23	Northern Leopard Frog	sensitive	NI	NI	NI	NI
24	Cope's Giant Salamander	assessment	NI	NI	NI	NI
25	Tricolored Blackbird (HP)	assessment	NI	NI	NI	NI
26	Western Sage Grouse	assessment	NI	NI	NI	NI
27	Pygmy Rabbit	assessment	NI	NI	NI	NI
28	Brazilian Free-Tailed Bat	assessment	NI	NI	NI	NI
29	Spotted Bat	assessment	NI	NI	NI	NI
30	Pileated Woodpecker	tracking	NI	MIIH	MIIH	MIIH

Determination for Federally Listed & Proposed Species
NE No Effect
NLAA May Effect - Not Likely to Adversely Affect
LAA* May Effect - Likely to Adversely Affect
BE Beneficial Effect
BI Beneficial Impact

Determination for Special Status Species - sensitive
NI No Impact
MIIH May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species
WIFV* Will Impact Individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species

*Trigger for a Significant Action As Defined In NEPA
** Note: Rationale For Conclusion Of Effects Is Contained In The NEPA Document

All special status species are discussed in Appendix C.

4.7 Range Management

4.7.1 Alternative A

All allotments or pastures contained within the burn area would be rested for at least 2 years as per Interagency Burn Area Rehabilitation guidance (USDI FWS 2001).

4.7.2 Alternative B

Rudio Mountain Allotment – resting this allotment for three years would result in an abundance of key grass species. This could lead to excess ground fuel and an increase in the potential for another fire in this area. It may also be less beneficial to wildlife species. Studies have shown that deer, elk and even antelope prefer to graze on new re-growth from grazed plants rather than dry, old dead grasses. The wildlife would probably concentrate on the burned areas where new grass would be coming in. Conversely, resting for three years, the ground fuel would be sufficient to aid in an under burn.

Kinzua - resting this allotment for three years would be very beneficial to the rehabilitation of the area affected by the fire - grasses, shrubs, trees would have a good chance to re-establish and a revised grazing management plan could be implemented during this time.

Sheep Gulch - resting this allotment would result in re-establishment of key species and provide an alternate grazing area for wildlife away from Timber Basin.

4.7.3 Alternative C

Same as alternative B.

4.7.4 Alternative D

Same as alternative B.

4.8 Cultural Resources

4.8.1 Alternative A

There would be no known effect – no cultural resources identified in project area.

4.8.2 Alternative B

Mechanical measures to rehab roads could adversely affect cultural resources (if known) already impacted by suppression dozer activity. Weed control through the use of chemicals could adversely effect certain desirable Native American food plants. Planting desirable shrubs could provide increased opportunity for Native American groups to continue traditional food gathering practices. Closing the area to all motorized off-road use could have a beneficial effect on cultural resources by eliminating degradation caused by compaction or soil disturbance.

Additional roads and skid trails could cause damage to cultural resources previously unidentified. No harvesting in green areas could eliminate potential impacts to cultural resources not previously identified in these areas.

There are potential impacts due to new roads and skid trails over cultural sites existing in those areas. Potential impacts through harvesting in green areas to cultural resources not previously identified in areas of <=35 percent slope.

With the winter condition stipulations impacts to cultural resources would be strictly limited and very minor in nature. If winter conditions are not met based on a sample survey if no cultural concerns are discovered harvest activities would be allowed to continue as 'no effect'.

Road closures could have a beneficial effect by eliminating impacts caused be motorized use, which include impaction and disturbance of cultural areas.

4.8.3 Alternative C

Same as Alternative B.

4.8.4 Alternative D

Same as Alternative B.

4.9 Visual Resource Management

4.9.1 Alternative A

If the burned area were left to natural recovery processes, changes in the color and texture of the area caused by the fire would remain visible for many years, and soil erosion may cause new changes in visual appearance. Browned trees and reduced or absent foliage would attract attention until the burned area had seen many years of natural reforestation. Re-seeding would diminish changes in line due to new roads and dozer lines created during suppression activities, however, berms and cut banks created by dozer work would remain visible.

4.9.2 Alternative B

Active rehabilitation of the analysis area would speed restoration of the basic elements of color, line and texture to pre-fire conditions. Reclaiming new roads and dozer lines as described would, within approximately three years, eliminate visible changes in line associated with the fire. Seeding and re-planting intensely burned areas would speed reforestation; thus contributing to the recovery of the basic elements of color and texture, however the brown colors and altered foliage of standing dead trees would remain visible. Erosion control measures would lessen the likelihood that soil erosion events would detract from visual quality in the future.

Removing burned trees and/or thinning areas of unburned trees would have a short-term effect on the visual resource elements of color and texture, the same two elements altered by the fire. Where brown or black vegetation now exists, bare soil would be visible until spring, when grasses would fill in around the green standing trees. Immediately after cutting, bare spots would be visible between standing green trees. After approximately ten years, seedling trees, estimated at 5 to 6 feet high, would be expected to fill in cut areas, gradually restoring the basic elements of form, color and texture to pre-fire conditions. The burned area would fill in with young trees, the green color of the new growth would replace the brown and black of the burn, and the foliage of new trees and shrubs would restore the texture element. In the long term, the proposed action would help restore the area to a condition similar to what existed before the fire, but in less time than would be expected to occur naturally.

4.9.3 Alternative C

Same as Alternative B.

4.9.4 Alternative D

Same as Alternative B.

4.9.5 Cumulative Effects

The potential for harvest on private lands in the area would increase the visible impacts across the landscape.

4.10 Recreation/Access

4.10.1 Alternative A

If no action is taken the entire burn area both on and off road would be open to all types of motorized travel. With reduced vegetation due to the fire, many new areas would be accessible by motorized vehicle. The combination of walk-in and drive-in hunting opportunities that existed prior to the fire would be replaced by drive-in hunting opportunities.

4.10.2 Alternative B

Closing the burn area to off road motorized access for 3, 5, or 10 years would eliminate the historical use of OHVs for hunting access during the period of closure, requiring some hunters to either change their traditional mode of access to horse or foot travel, or to seek another hunting area. This would displace older or disabled individuals who are unable to walk over rough terrain, and are therefore unable to adapt to non-motorized access. Closing the burn area to off road motorized access would also discourage individuals from collecting shed antlers in the area during the period of closure, as OHVs are commonly used to systematically look for antlers.

4.10.3 Alternative C

Same as description in Alternative B.

4.10.4 Alternative D

Same as description in Alternative B with the following additions:

Permanently closing two 2-track access roads to motorized travel to reduce road density would affect recreationists who have traditionally traveled these roads, by reducing the amount of public land that has been accessible by road and requiring that these areas be reached via foot or horse travel.

4.10.5 Cumulative Impacts

With less cover for wildlife and unrestricted motorized travel, habitat security is reduced. Quality hunting experience may be reduced due to fewer animals being held on public lands as a result of habitat conditions that are more open.

Improving wildlife habitat and watershed health would improve opportunities for hunting and collecting shed antlers over the long term, and watching wildlife.

4.11 Off-Road Vehicle Closure

4.11.1 Alternative A

There would be no off-road closures under this alternative.

4.11.2 Alternative B

A decision to close the area to off-road vehicular access for a period of 3, 5, or 10 years would be included in the Decision Notice for this EA. Each of these closures addresses resource concern issues for sedimentation, erosion, reforestation, snag retention and habitat security for big game.

A three year closure would protect the ground from surface disturbance long enough to allow grass recovery and associated soil retention dependent on root structures to occur. Within three years a major concern for mass wasting of soil and erosion from steep slopes would be greatly reduced due to the presence of sufficient ground cover. Grazing is also being curtailed for a three year period in order to allow full recovery of the grass and ground cover component.

A five-year closure would further protect the replanted seedling from trampling or being torn out of the ground. These seedlings would have adequate time to establish and persist.

A ten-year closure would further protect the retention of snag habitat through limiting access of woodcutters to these areas. A ten-year closure is also being considered for firewood cutting within this area to also protect snag retention for wildlife species. It would also allow trees and shrubs to grow to a size that would provide hiding cover.

4.11.3 Alternative C

Same as Alternative B.

4.11.4 Alternative D

Same as Alternative B.

4.12 Social and Economic Resources

Recovering the economic value of burned timber and providing timber products to the economy contribute to socio-economic effects. For the purposes of describing socio-economic effects on the local economy, the local economy was considered to be Grant County, even though Grant County may not realize all of the economic contributions.

The lumber and wood products sector, including secondary wood products, is a large contributor to the economic well being of the Grant County area. Contributions are made not only by direct employment and salaries, but also because many local businesses derive a portion of their sales from lumber and wood products employees.

The effects to the local economy are based on the net sale value, the amount of volume removed, and the number of jobs created. The actual net sale value would depend on the market value of the timber when sold and the actual logging costs. Full suspension logging requires a yarding system that is more expensive than traditional ground yarding systems. A cable yarding system would be approximately twice the cost of a ground yarding system. An aerial system would be approximately three times the cost of a ground system.

Rapidly changing market conditions and the actual amount of insect damage, check and rot could vary considerably and could reduce the economic value of burned timber. These figures are based on average costs from past sales. The net sale value was calculated using two different log values that reflect market variations.

The net sale value was calculated using the value of the timber to be removed and subtracting the costs of logging. Logging costs include stump to truck (what it costs to get the trees from the unit to the landing), haul (getting the trees from the landing to the mill), road maintenance and construction, erosion control, and slash treatment.

4.12.1 Alternative A

There would be no net sale value and no jobs would be created. There would be no benefits to the local economy. This alternative would not have positive impacts to the local economy because timber related jobs would not be maintained.

4.12.2 Alternative B

There would be some contributions to the local economy. Table 4 displays the expected net sale value using both a low and a high log value and the amount of timber that would be recovered. Table 4 also displays the expected number of timber and timber related jobs that would be maintained. The estimated timber related jobs would occur in the next year or two as timber is harvested. Indirect benefits from employment would contribute to the local economy.

There would also be some benefits to the local economy from planting activities not related to commercial timber harvest. These benefits include spending and employment.

4.12.3 Alternative C.

Same as alternative B.

4.12.4 Alternative D

Same as alternative B.

4.12.5 Cumulative Effects

Harvest of adjacent private lands would also benefit the local economy.

5. No Impact Items

The following critical elements were considered, but will not be addressed because they would either not be affected or do not exist in the project are:

5.1 Agricultural Lands (prime or unique)
5.2 Air Quality
5.3 Areas of Critical Environmental Concern
5.4 Environmental Justice
5.5 Floodplains
5.6 Paleontological Resources
5.7 Wastes (hazardous or solid)
5.8 Wild and Scenic Rivers
5.9 Wilderness (including Wilderness Study Areas)

6. Coordination and Consultation

6.1 Persons and Agencies Consulted

US Fish and Wildlife Service Jeff Dillon Wildlife Biologist
Confederated Tribes of the Warm Springs

In an effort to address Native American concerns for the proposed activities associated with the rehabilitation plan, attempts were made to contact representative of the CTWSRO, Burns Paiute and CTUIR. Contact was made with all three of these tribal groups via phone conversations. All three tribal entities expressed concern about traditional plant regeneration, specifically the shrub component. The CTWSRO and the Burns Paiute provided lists of important plants they are concerned about (Appendix B). In each contact, a brief description of the proposed actions associated with the rehabilitation plan was discussed. Included in these discussions were BLM's objectives of soil stabilization, forest health, and water quality. The BLM will continue to communicate and coordinate with these recognized Tribes.

6.2 Preparers (BLM)

Robert Vidourek	Forester
Colleen Wyllie	Range Conservationist
John Morris	Fisheries Biologist
Anna Smith	Hydrologist
Ed Horn	Soils Scientist
Monte Kuk	Wildlife Biologist
John Zancanella	Cultural/Paleontological Resources
Ron Halvorson	Botanist
Heidi Mottl	Outdoor Recreation Planner
Karen Siegel	GIS Specialist
Brent Ralston	Writer/Editor

6.3 NEPA requirements met:

_____ _____

Dan Tippy Date
Central Oregon Resource Area
Environmental Coordinator

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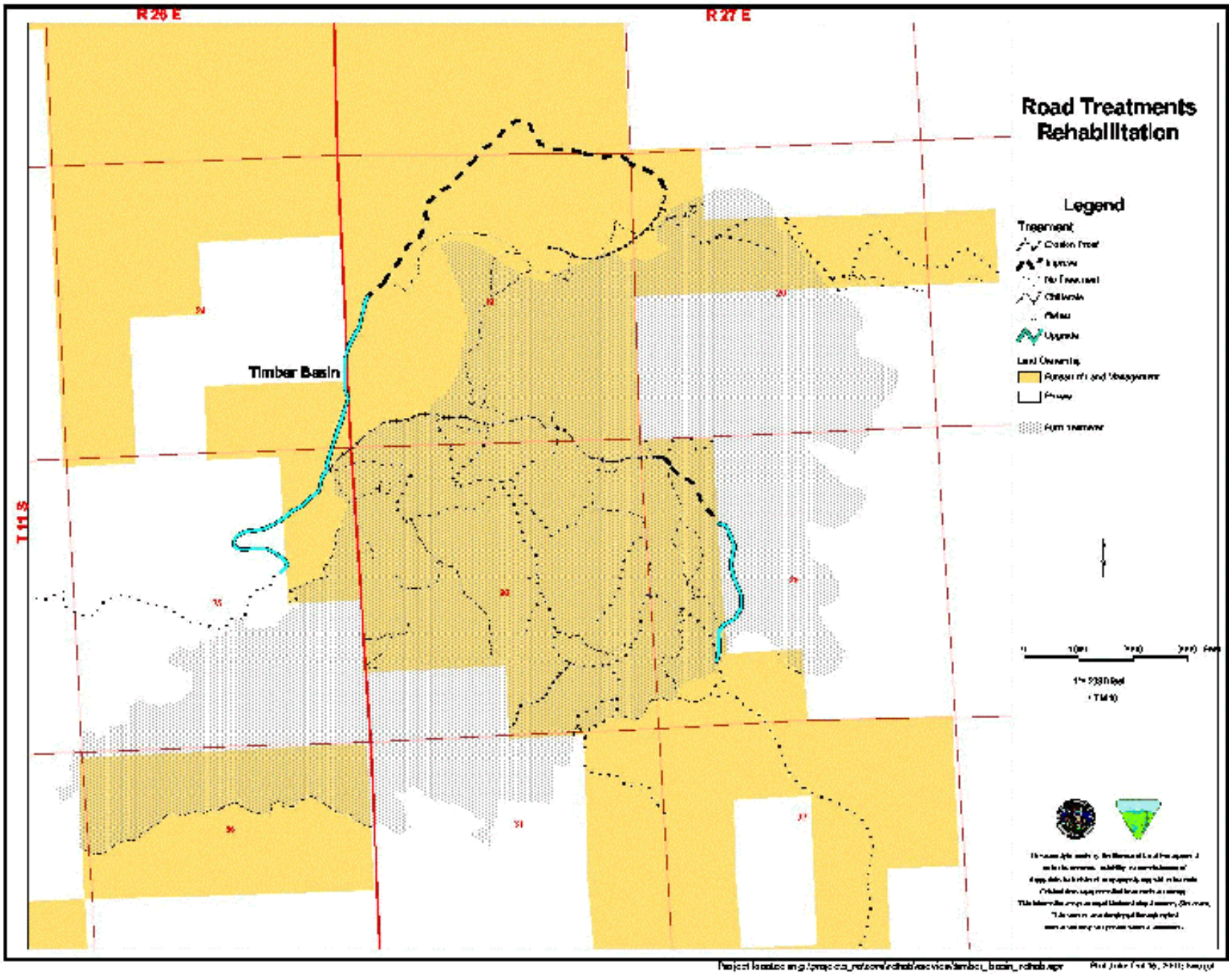
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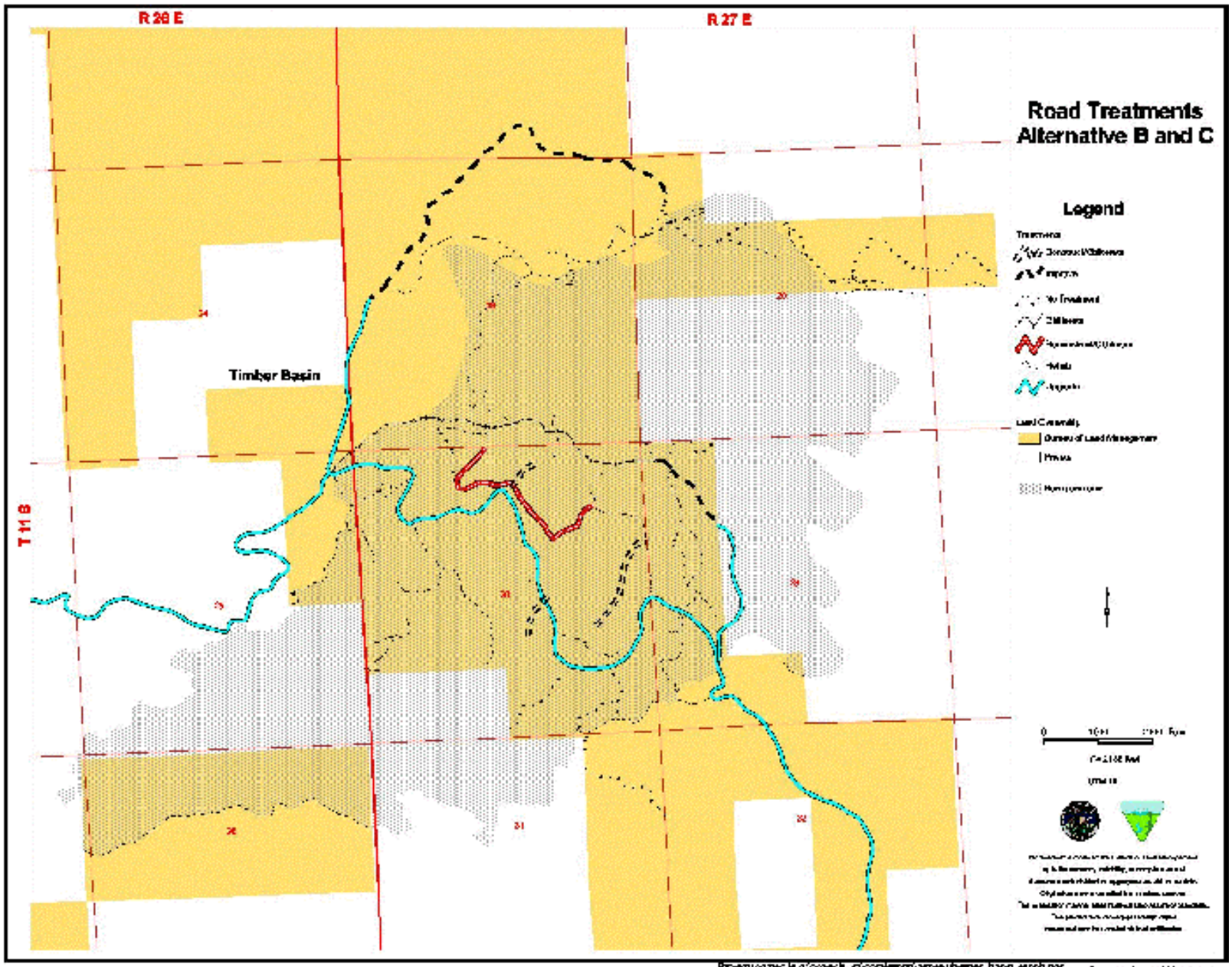
Rehabilitation
Legend
Treatment
Land Ownership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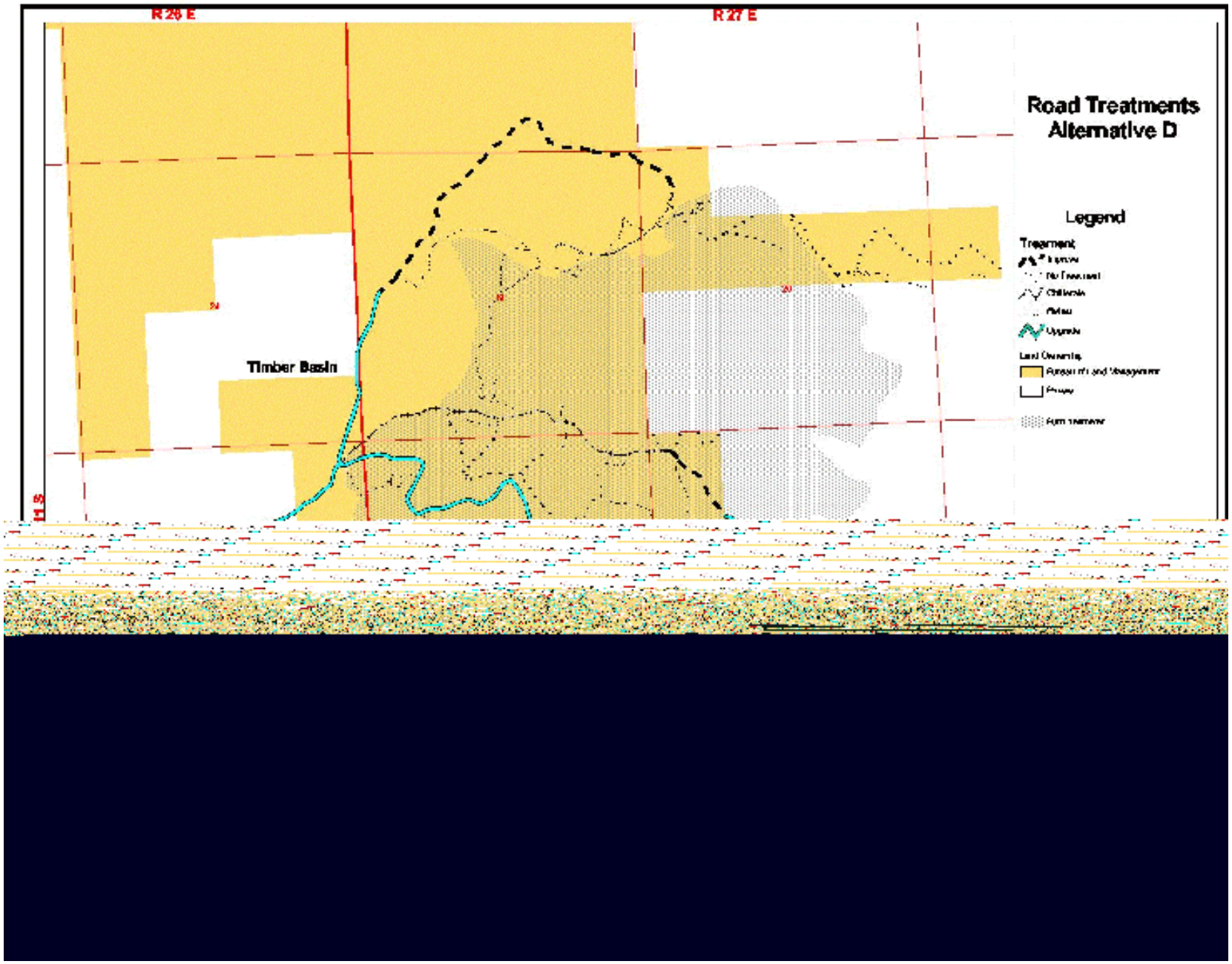
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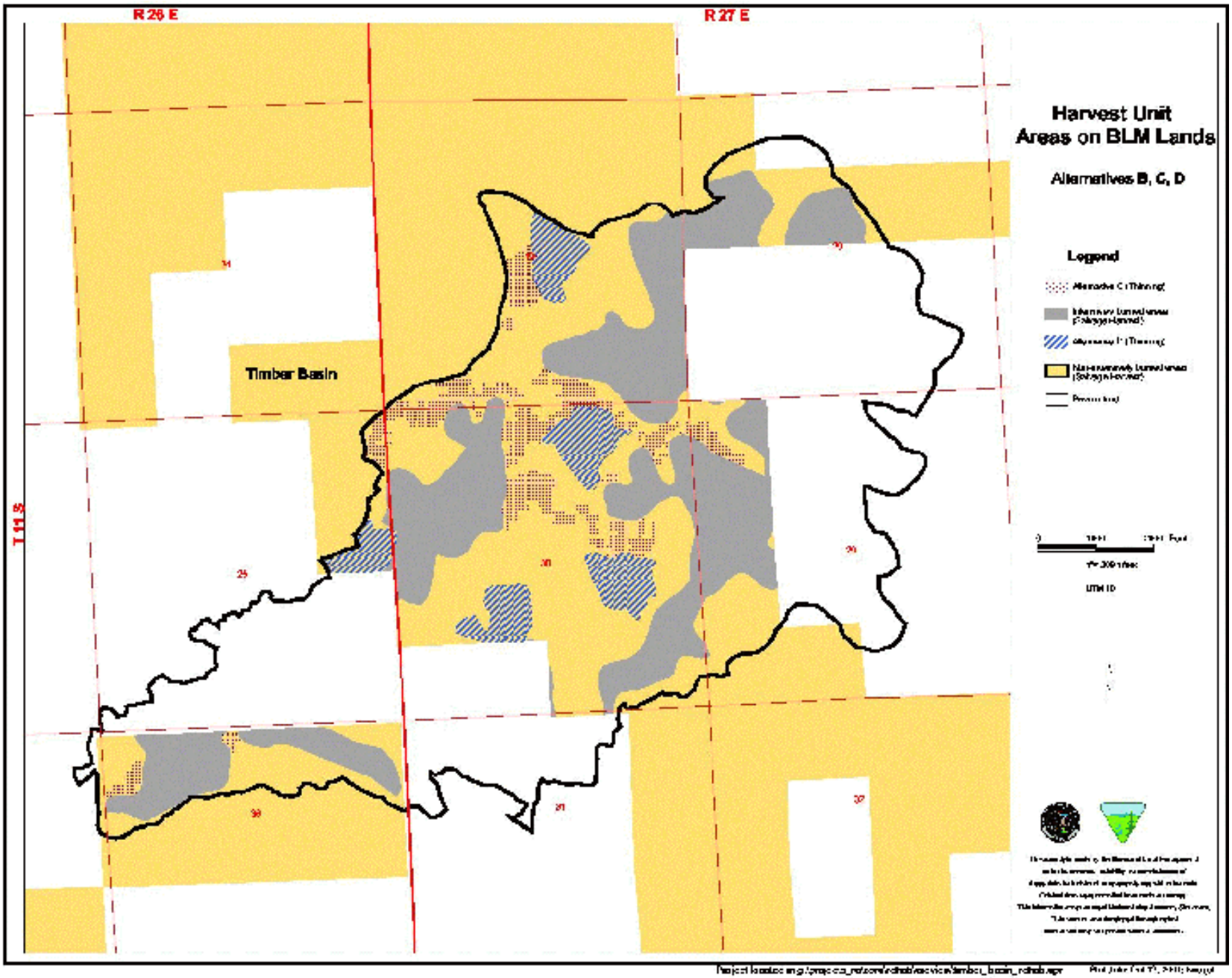
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Timber Basin
Harvest Unit
Areas on BLM Lands
Alternatives B, C, D
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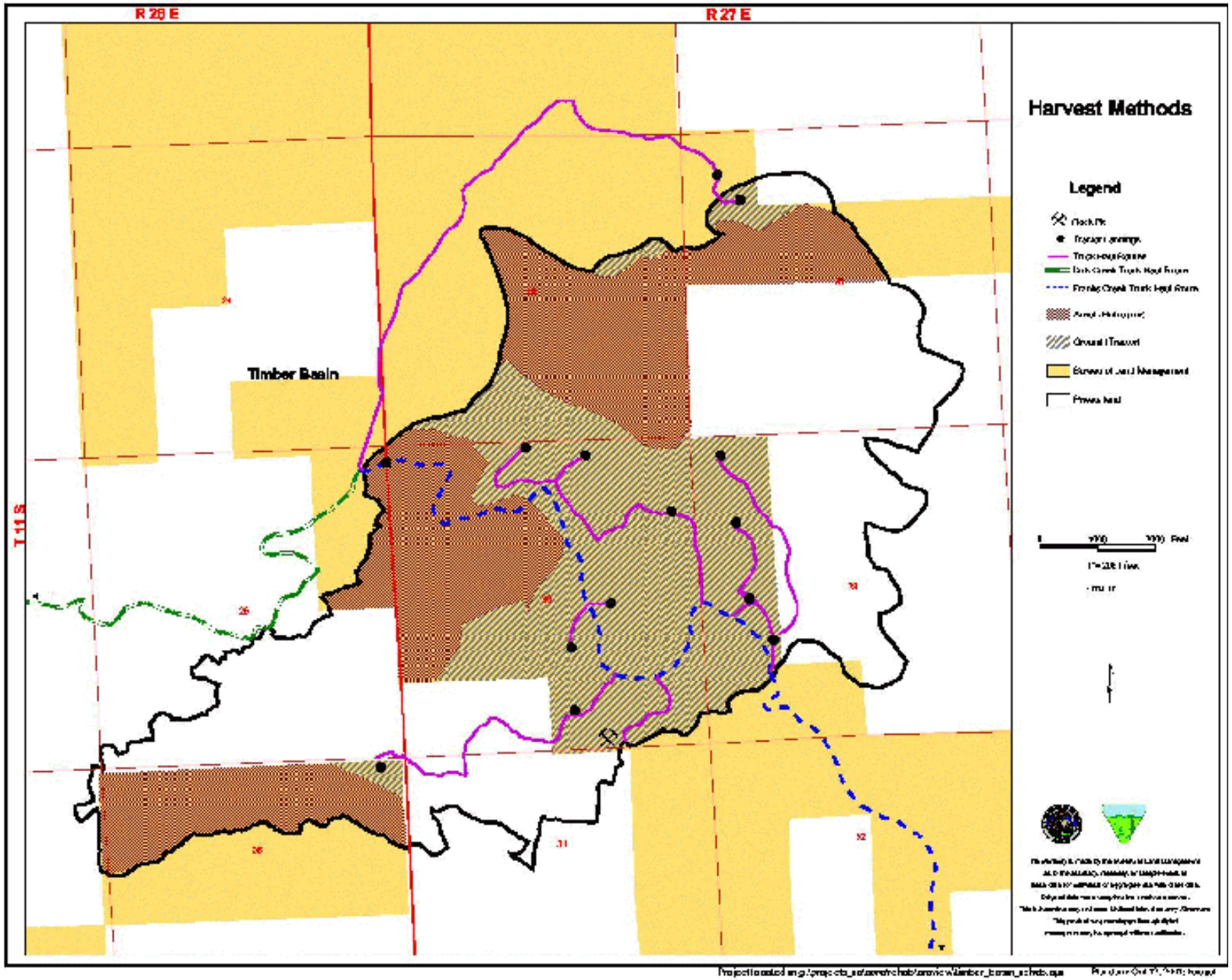
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Harvest Methods
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Private land

Appendix A

Potential Natural Vegetation

1. North Slopes

Potential Natural Vegetation of North and Northeast aspect slopes over 15 percent are classified by Soil Vegetation Inventory Method (SVIM) as Pine-Mixed Fir-Sedge community. A typical plant community of this site includes an over-story of mature ponderosa pine, Douglas fir and usually some grand fir with a total cover of about 40-70 percent. The mid-story consists of varying amounts of saplings and pole-sized trees. Ponderosa pine is a strong component of this plant community and will perpetuate itself in the stand under natural conditions. A dense stand and a wide variety of grasses and forbs dominate the under-story. Elk sedge makes about 50 percent cover, pinegrass 10 percent and sod bluegrasses 5 percent. A variety of other grasses occur in minor amounts. Perennial forbs such as heartleaf arnica, lupine, strawberry and yarrow make up about 5 percent cover. Shrubs, including bitterbrush, low Oregon grape, common snowberry, rose and spirea make up about 10 percent cover. Tree reproduction is about 5 percent cover. (USDA SCS, 1970.)

2. South Slopes

Potential Natural Vegetation of South aspect slopes over 15 percent are classified by the Plant Associations of the Blue and Ochoco Mountains (Johnson et al. 1992) as a Ponderosa pine/elk sedge plant association. Ponderosa pine is climax. Juniper and Douglas fir are often associated at low coverages. Shrub coverages are low with common snowberry and Oregon grape frequently associated. Elk sedge is always present. Grasses are abundant in this type with Wheeler's bluegrass, bluebunch wheatgrass, Idaho fescue and prairie junegrass often occurring. Forbs are minor components. In early seral stands, the bunch grass, tailcup lupine, heartleaf arnica and yarrow may be more prominent. Moisture competition between elk sedge and pine seedlings may be severe. Underburning enhances pine seedling establishment. These sites are moderately productive for Ponderosa Pine. Tree canopy coverage ranges from 18-82 percent. Table 1 indicates the mean cover of the principal species for this site.

Table 1. Species and cover for this south slope areas.

Species	Mean Cover (percent)
Ponderosa Pine	39
Douglas-fire	3
Western Juniper	4
Grand Fir	trace
Common snowberry	2
Creeping Oregon-grape	2
Bitterbrush	2
Elk sedge	32
Pinegrass	3
Idaho fescue	25
Wheeler's bluegrass	4
Bluebunch wheatgrass	13
Bottlebrush squirreltail	2
Prairie junegrass	5
Tailcup lupine	4
Western hawkweed	1
Yarrow	2
Broadpetal strawberry	2

3. South Slope Rims

The upper middle or third of the South aspect slopes over 15 percent are classified by the Plant Associations of the Blue and Ochoco Mountains as a Ponderosa pine/mountain-mahogany/elk sedge plant association. This plant association can be found along the discontinuity between the Picture Gorge Basalt Flows and the John Day Formation in Timber Basin. Ponderosa pine and western juniper generally form an open forest above the mountain-mahogany stand. Douglas fir may occur in limited amounts. Tree canopy covers ranges from 24-73 percent. Table 2 indicates the mean cover of the principal species for this site.

Table 2. Species and cover percentages for south slop rims.

Species	Mean Cover (percent)
Ponderosa Pine	37
Western Juniper	2
Douglas-fir	2
Mountain-mahogany	18
Creeping Oregon-grape	2
Bitterbrush	3
Common snowberry	5
Golden current	1
Elk Sedge	32
Wheeler's bluegrass	2
Bottlebrush squirrel tail	1
Western needlegrass	2
Yarrow	2
Western hawkweed	2
Narrowleaf pussytoes	2
Heartleaf arnica	2

Creeping Oregon grape is commonly found. Elk sedge is the dominant herbaceous plant. This type is the most mesic (dry) of the plant association. Fire may damage mountain-mahogany and bitterbrush. Pinegrass may be promoted when it is present and fire occurs. Overgrazing may promote bottlebrush squirreltail, western needlegrass, yarrow and heartleaf arnica. (Johnson et al. 1992).

4. Drainages and Springs

The Plant Associations of the Blue classify the moist riparian areas in the valley bottoms and Ochoco Mountains (Johnson et al., 1992) as a grand fir/elk sedge plant association. This plant association occurs on the warmest, driest sites possible for grand fir plant associations. Ponderosa pine and Douglas fir are strongly associated with grand fir. Common snowberry is often present in limited amounts. Elk sedge is the dominant herbaceous plant. Pinegrass is absent or limited in occurrence. Forbs appearing at low coverage are bigleaf sandwort, white hawkweed, and heartleaf arnica. Many stands will have a ponderosa pine overstory dominance reflecting the repetitive occurrence of past underburning with resultant elimination of grand fir. However, this is not the case in Timber Basin. Tree canopy cover ranges from 30-93 percent. Table 3 indicates the mean cover of the principle species for this site.

Table 3. Species and cover percentages for drainages and springs.

Species	Mean Cover percent
Grand fir	41

Douglas-fir	11
Ponderosa pine	18
Western Larch	3
Common snowberry	3
Prince's pine	3
Creeping Oregon-grape	3
Elk sedge	25
Pinegrass	3
White Hawkweed	2
Heartleaft arnica	2
Bigleaf arnica	4
Woods strawberry	3
Sidebells pyrola	2
Rattlesnake plantain	1
Yarrow	2
Tailcup lupine	3

In the absence of fire disturbance, as in Timber Basin, grand fir has the potential to dominate these sites. Douglas fir and grand fir are susceptible to spruce budworm and tussock moth defoliation and damage. (Johnson et al., 1992)

Some lower gradient spring and valley bottom sites (less than 4 percent) may have the potential to support an aspen/common snowberry plant community. Description of similar grand Fir/Common Snowberry (for the Mountain alder-red osier dogwood higher gradient areas) and Aspen/Common Snowberry plant communities can be referenced in the Mid-Montane Wetland Plant Associations of the Malheur, Umatilla and Wallowa-Whitman National Forests (Crowe et al. 1997).

Appendix B

Native American Desirable Plant Lists

I. Kathy Martin – Tribal Archaeologist, Brigette Whipple, Cultural Anthropologist & 6 members of Culture & Heritage Committee, compiled this list. The plants listed contain cultural value to the tribes and are utilized for subsistence, medicinal, craft, etc within the forested areas of the reservations and ceded area boundaries. This is not to be considered complete. It is a working list, which shall be added to as time passes.

1. Rattlesnake Plantain	Goodyera oblongifolia
2. Pine-drops	Pterospora andromedea
3. Woods rose/Baldhip rose	Rosa gymnacarpa
4. Woods strawberry	Fragaria vesca
5. White vein pyrola	Pyrola picta
6. Ponderosa pine (needles	Pinus ponderosa
7. Douglas-fir	Pseudotsuga menziesii
8. Western larch	Larix occidentalis
9. Lodgepole Pine	Pinus contorta
10. Cascade Oregon Grape	Berberis nervosa
11. Prince's Pine	Chimaphila umbellate
12. Incense cedar	Calocedrus decurrens
13. Vine Maple	Acer circinatum
14. Trillium	Trillium ovatu
15. Vanilla Leaf	Achlys triphilla
16. Blue Elderberry	Sambucus cerulea
17. Aspen	Polulus tremuloides
18. Black cottonwood	Populus trichocarpa
19. Willow	Salix exigua
20. Yew	Taxus brevifolia
21. Wild Ginger	Asarum caudatum
22. Western Red Cedar	Thuja plicata
23. Yellow skunk cabbage	Lysichitum americanum
24. Pipestems	Clematis ligusticifolia
25. Arrowleaf balsamroot	Balsamorhiza sagittata
26. Lupine	Lupinus latifolius
27. Camas	Camassia Quamash
28. Cat tail	Typha latifolia
29. Shooting star	Dodecatheon hendersonii
30. Green leaf manzanita	Arctostaphylos patula
31. Yarrow	Achillea millefolium
32. Common Snowberry	Symphoricarpos mollis
33. Ocean spray	Holodiscus discolor
34. Tiger lily	Lilium columbianum
35. Paintbrush	Castilleja miniata
36. Yellow bells	fritilliria pudica
37. Ione	

II. Culturally Sensitive Plants identified by: The Burns Paiute Tribe

Scientific Name:	**Common Name:**
Archilea millefolium	Yarrow
Allium acuminatum	Tapertip onion
Album macrum.	Rock onion
Album madidum	Swamp onion
Anaphalis margaritacea	Pearly everlasting
Apocynum cannabium	Dogbane/Indian hemp
Arctostaphylos waursi	Kennikinnick
Asclepias syriaca	Milkweed
Artemesia tridentata	Balsmroot
Berberis repens	Oregon grape
Cercoarpus ledifolius	Mountain mahogany
Cirsium edule	thistle
Cornus stolenifera	Red dog ozier
Desurainia sophia	Tansy-mustard
Elymus cinercus	Great Basin wild rye
Larix occidentalis	Larch
Lewsisia redivia	Bitter root
Lomatiumcanbyi	Sweet biscuit root
Lomatium coos	Biscuitroot
Lomatium gormanii	Desert parsley
Lomatium hendersonii	Henderson lomatium
Lomatium nudacauli	Desert celery
Mentha arvensis	Indian mint
Mentzekia albicanlis	blazing star
Nicotiana altenuata	Coyote tobacco
Oryzopsis hymenoides	Indian ricegrass
Perideridia bolanderi	Bolanders yampa
Perideridia gairdneri	Gairdneri yampa
Phragmites comnunis	Reed grass
Pines ponderosa	Ponderosa Pine
Populus tremuloides	Quaking aspen
Prunes americana	Wild plum
Prunes virginiana	Chokecherry
Rosa sp.	Rose hips
Ribes aureum Pursh	Current, golden
Sagittaria latifolia	Arrowhead/wapato
Salix exigua	Grey willow
Salix exigua spp.	Coyote willow
Salix spp.	Red willow
Sambucus canadensis	Elderberry
Scirpus validus	Bullrush
Suada depressa yar.	Seepweed
Typha latifolia L.	Cattail
Urtica dioica spp.	Stinging nettle
Vaccinium membranacoum	Huckleberry
Wyethia amplexicaulis	Mules ear

Appendix C

Reply To: 2600 Subject: **Timber Basin Fire Restoration Restoration - WILDLIFE REPORT**
To: Area Manager From: Monte Kuk (Wildlife Biologist)
Date: _____ /S/_____

LIST OF TABLES, TERMS, AND ACRONYMS USED

LIST OF TERMS USED

Biological Potential - the maximum production of a selected organism that can be attained under optimum management.

Hiding Cover – Any vegetation capable of hiding 90 percent of a standing adult deer or elk at 200 feet or less (Thomas et al. 1979).

Historic range of variability (HRV)--the variability of regional or landscape composition, structure, and disturbances, during a period of time of several cycles of the common disturbance intervals, and similar environmental gradients. The historical 1,000-year time period, or a subset of that period, is commonly used as the "window" for HRV; see Hann and others (1997) for details.

Post Fledging Area - within the nesting home range, the area (approximately 420 acres) of concentrated use by the goshawk family after the young leave the nest. The 420 acres are exclusive of the suitable replacement nest areas.

Subnivial- below snow habitats created mainly by numerous down logs providing openings below the snow.

LIST OF ACRONYMS

BA – Joint Aquatic and Terrestrial Programmatic Biological Assessment – Prineville BLM and Deschutes and Ochoco National Forests
DBH – Diameter at Breast Height
F.S. – Forest Service
GIS – Geographic Information Systems
HRV- Historic Range of Variability
KLA – Key Linkage Area (Lynx)
LAU – Lynx Analysis Unit
OHV – Off Highway Vehicle
PFA – Post Fledging Area (Goshawk)
RMP – Resource Management Plan
TE&S – Threatened, Endangered, and Sensitive Species
USF&WS – United States Fish and Wildlife Service

ALTERNATIVE DESCRIPTION – See Section 2.1 through 2.6 of the EA for description of Alternatives.

INTRODUCTION

This wildlife resource report was developed to address the effects of the proposed actions efforts within the Timber Basin Fire Restoration on wildlife resources. This report will describe the existing condition and desired condition of the Timber Basin Fire Restoration as well as the potential effects of the restoration alternatives as they relate to wildlife species abundance and distribution. Analysis data will be reviewed in an attempt to describe the functions and interactions between wildlife and the conditions/processes associated with the Timber Basin Fire Restoration and surrounding habitats. Data analysis will tier to the John Day Resource Management Plan (RMP). The Threatened, Endangered and Sensitive (TE&S) section of this report will function as the Biological Evaluation and review for consistency with the Joint Aquatic and Terrestrial Programmatic Biological Assessment – Prineville BLM and Deschutes and Ochoco National Forests (BA).

EXISTING CONDITIONS

The analysis area is located in the John Day Resource Area approximately 7 – 10 miles north and east of the John Day River. Habitats consist of mixed conifer stands ranging from second growth stands dominated by ponderosa pine to relatively dense stands containing scattered large ponderosa pine, Douglas fir, and grand fir with multiple canopy structure. Elevations range from 4400 to 5400 feet. There are several springs in the analysis area with several more relatively close to the analysis area. Franks Creek (3 miles primary channel and 8.3 miles of secondary channel) and Ferris Creek (1 mile primary channel and 4 miles of secondary channel) are the primary riparian areas in the analysis area.

Habitat functions in the Timber Basin Fire Restoration area have been modified from historic conditions. Practices such as timber harvest, fire suppression, grazing, and roading have changed the quantity and quality of wildlife habitat for many species. An overstory removal was completed on the majority of the area in the 1980s. Habitats surrounding the analysis area are dominated by juniper and sagebrush to the west, south and some of the northern portions. Habitats to the east have mixed conifer conditions similar to those in the analysis area. Human activity on private lands surrounding the analysis area limited with a few residence on the eastern portion of the analysis area. The primary human activity in the analysis area is hunting.

John Day RMP states, “Maintain and improve the current level of habitat diversity.

The Interior Columbia Basin Review addressed current levels and distribution of source habitats throughout the basin. Source habitats are those having ample habitat for individuals to reproduce and thus have offspring that disperse into other habitats (an area that gives off things). Source habitats are those characteristics of macrovegetation that contribute to stationary or positive population growth for a species in a specified area and time. Source habitats contribute to source environments (Pulliam 1988, Pulliam and Danielson 1991), which represent the composite of all environmental conditions that results in stationary or positive population growth for a species in a specified area and time. Habitats that have been altered significantly enough to preclude species from using them or successfully producing offspring are referred to as sink habitats (an area that absorbs things).

The analysis and surrounding areas are representative of findings in the Interior Columbia Basin review of source habitats for terrestrial vertebrate species, which include:

“Source habitats are likely underused for many species when such habitats exist in areas that contain moderate to high road density. In some cases, the presence of moderate or high densities of roads may index areas that function as population sinks, and that would otherwise function as source environments if road density was low or zero.”

“Source habitats for most species declined strongly from historical to current periods across large areas of the basin. Strongest declines were for species dependent on low-elevation, old-forest habitats, for species dependent on combinations of rangelands or early-seral forests with late-seral forests, and for species dependent on native grassland and open-canopy sagebrush habitats. Widespread but less severe declines also occurred for most species dependent on old-forest habitats present in several elevation zones; for species dependent on early-seral forests; for species dependent on native herbland, shrubland, and woodland habitats; and for species dependent on native sagebrush habitats. Source habitats for all of the above-named families have become increasingly fragmented, simplified in structure, and infringed on or dominated by exotic plants.”

Large-scale analysis in Central Oregon have come to similar conclusions. The following summary was made by Simpson, 1998 of the vegetative changes in the Crooked River Sub Basin within the analysis area are representative of those found throughout the analysis area:

1. There has been a species shift from mid-seral to late-seral, i.e., less ponderosa pine and more fir.
2. Shortages of large structure (>21 inches d.b.h.) stages occur, which is most pronounced in the dry grand fir, Douglas fir and Ponderosa pine plant associations.

3. Stand density has increased in all plant association groups.
4. Pole-sized seral /structural stages are found in greater abundance than at any time during the last several hundred years.
5. Western juniper has increased in density and extent within the sub-basin.
6. Quaking aspen and black cottonwood forests, which were common riparian area species, have been reduced to small remnant populations. (Ochoco NF, 1998)

Many of the low-elevation habitats in the analysis area are declining primarily due to increased conifer competition. Low elevation ponderosa pine stands once contained a sparse distribution of large diameter trees with very open stand conditions under the primary canopy. In some situations the presence of roads reduces the effectiveness of returning these habitats to more open stand conditions. Higher densities of conifer trees have been providing increased hiding cover and habitat security. Returning these habitats to more natural open conditions increases impacts of road associated factors like hunting, poaching, sight seeing, etc.

TE&S Wildlife

The following Special Status species were considered but **do not have potential habitat** in the analysis areas: (Habitat probability indices and survey records are on file at the Prineville District Office).

Washington Ground Squirrel, Oregon Spotted Frog, Upland Sandpiper, Western Pond Turtle, Northern Leopard Frog, Cope's Giant Salamander, Tricolored Blackbird, Burrowing Owl, Pygmy Rabbit, Western Sage Grouse, Spotted Bat, Brazilian Free-Tailed Bat, Ferruginous Hawk, Columbia Sharp-tailed Grouse, Yellow-Billed Cuckoo, and Streaked Horned Lark, Painted Turtle, Three-toed Woodpecker, Northern Bald Eagle, Peregrine Falcon

The following Special Status species **have potential habitat** and will be discussed in detail:
Canada Lynx (Felis canedensis): Threatened (USFWS), Threatened (BLM OR)
Townsend's big eared bat (Corynorhinus townsendii): Category II (USFWS), Sensitive (BLM OR)
Northern Goshawk (Accipiter gentilis): Sensitive (BLM OR)
Northern Pygmy Owl (Glaucidium gnoma): Sensitive (BLM OR)
Flammulated Owl (Otus flammeolus): Sensitive (BLM OR)
White-headed Woodpecker (Picoides albolarvatus): Sensitive (BLM OR)
Black-backed Woodpecker (Picoides arcticus): Sensitive (BLM OR)
Pygmy Nuthatch (Sitta pygmaea): Sensitive (BLM OR)
Fisher (Martes pennanti): Former Federal Candidate (USFWS), Sensitive (BLM OR)
Pileated Woodpecker (Dryocopus pileatus): Tracking (BLM OR)

FEDERALLY LISTED

Lynx (Lynx canadensis): The analysis area is outside of designated lynx denning, foraging, or travel habitat. Verts and Carraway (Land Mammals of Oregon, 1998) contend that there is no information to suggest that lynx have ever been a resident, reproducing species in the state of Oregon. McKelvey et al. (History and distribution of lynx in the contiguous United States, 1999) in their work on lynx ecology did not challenge this view for Oregon. The project activities will be evaluated based on potential effects to incidental individuals dispersing through the area. No sightings have been documented within the analysis area. No formal surveys have been completed in the analysis area.

Bureau Special Status Species:

Townsend's Big Eared Bat (Plecotus townsendii): Maternity and hibernacula sites are associated with caves, mines, lava tubes, and buildings. Rimrock, cliffs, bridges, boulder fields, and bark of large trees have the potential to be used as day roosts. The analysis area has no known maternity roost or hibernacula sites within several miles. There are also no large rock structures, buildings, or bridges with potential for day roosting. There are a low numbers of large diameter trees and a few small rock outcroppings. Openings in timbered areas with standing water association are prime foraging opportunities for Townsend's big-eared bats. Bats are known to travel long distances to foraging sites, so the analysis area has the potential to be used as a foraging area. Formal surveys have not been conducted.

Northern Goshawk (Accipiter gentilis): The northern goshawk is classified as a U.S. Fish and Wildlife Service, Category 2 species, and a State sensitive species. Goshawk nesting home ranges cover approximately 420 acres (includes the nest site, foraging area, and post-fledging family area) (Reynolds et al. 1991). Goshawks prefer open stands for foraging activities; however, for nesting they require canopy closures for protection for the weather and other raptor species. Goshawk nesting habitat is generally found with ¼ mile of a spring or smaller order stream. These sites provide higher canopy cover for nesting due to higher growth potential. The analysis area contains potential reproductive and foraging habitat. No sightings have been recorded in the analysis area. Formal surveys have not been conducted.

Northern Pygmy Owl (Glaucidium gnoma): The Northern Pygmy-owl is found in mixed coniferous-deciduous forests, riparian woodlands, and drier woodlands including ponderosa pine. Pygmy-owls use abandoned woodpecker holes for nesting and hunt in open areas within the forest matrix (Csuti et al., 1997). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Flammulated Owl (Otus flammeolus): Flammulated owl utilizes open forests that have a ponderosa pine component, but has been found in Douglas-fir requiring fairly large trees for roosting with grassland or meadows in the area. Flammulated owls nest in abandoned woodpecker holes or natural tree cavities (Csuti et al., 1997). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

White-headed Woodpecker (Picoides albolarvatus): White-headed woodpeckers are closely associated with ponderosa pine and mixed conifer forest with relatively large trees and snags characteristic of older forests (Csuti et al., 1997). The low numbers of large diameter ponderosa pine trees reduces the likelihood the analysis area is being used by white-headed woodpeckers. The project area does have marginal reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Black-backed Woodpecker (Picoides arcticus): Black-backed woodpecker utilize older forest stands of lodgepole pine, ponderosa pine, and western larch for nesting (Csuti et al., 1997). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Pygmy Nuthatch (Sitta pygmaea): In Oregon the pygmy nuthatch utilizes mature ponderosa pine woodlands with less than 70% canopy closure and adequate large (average 20" dbh) ponderosa pine snags (Csuti et al., 1997). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Pacific Fisher (Martes pennanti): Fisher primarily use mature, closed canopy coniferous forests with some deciduous component, frequently along riparian corridors. The fisher is an opportunistic carnivore whose diet includes small rodents, rabbits, squirrels, porcupines, amphibians, reptiles, and birds and their eggs (Csuti et al., 1997). The analysis area is a relatively small area of habitat surrounded by large tracts of non-habitat. The analysis area is not of sufficient size to provide a home range, but has the potential to be used as incidental foraging or dispersing habitat. Winter surveys utilizing bait stations, track plates, track surveys, and cameras have been used on the surrounding Ochoco and Malhuer N.F.s with no fisher being identified.

Pileated Woodpecker (Dryocopus pileatus): The pileated woodpecker is a BLM tracking species. East of the Cascade Mountains, both ponderosa-pine and mixed-conifer forests are used, with the highest population densities normally in old-growth areas of sufficient size to support the birds (Bull 1990, Thomas et al. 1979, Bull 1975). Other habitat features important to this species include high (>60%) canopy closure, sufficient snags for feeding and nesting, and abundant down logs for foraging. A recent study conducted in the Blue Mountains (Bull et al. 1993) indicates that the Forest Plan strategy for meeting pileated woodpecker habitat requirements may be inadequate. The study results indicate that the size of the allocated areas (300 acres) are too small, and that the snag and downed log guidelines are insufficient to meet foraging requirements. Snags and down logs are key habitat components to pileated habitat. See the snag and down log section of this report for effects of the alternatives to snags and down logs.
Primary habitats for pileated woodpeckers would occur in habitats containing large structure. Past overstory removals have reduced the amount of potential habitat. Incidental sightings are documented in the analysis area. Formal surveys have not been conducted.

Large Structure Habitat: Historic timber harvest in Timber Basin have removed the large structure component. Unburned areas have higher concentrations of understory trees than historically occurred under normal fire frequencies. The analysis area has the potential to be multi story mixed conifer. This is particularly true on the north slopes. In these areas further reducing the large tree component will continue to set these stand developmentally back. Removing the under story trees would allow the larger trees in the stands to develop into large structure faster but in combination with the fire would further reduce the amount of multi story habitats available in the watershed.

The majority of the analysis area under normal fire intervals would have been maintained in more of a single story mixed conifer condition with ponderosa pine dominate species. Precommercial thinning or prescribed fire would reduce these understory trees and allow those trees in the 12 – 20" dbh range to continue to grow and become a large tree dominated stand.

LOS stands have structural components that provide micro climates and habitats. Many species are adapted to these micro climates or habitats. LOS ponderosa pine communities were preferred by species like white headed woodpeckers and northern goshawks that preferred the openness of the stands. LOS conditions typical in mixed conifer and fir stands were preferred by species like pileated woodpeckers or wolverines that utilized the multiple canopy to avoid detection and utilized the higher snag and down log levels. Although habitat conditions may be optimal in one type of LOS, because of the similarities many species can utilize both conditions. This is true for most of the woodpeckers, goshawk, and numerous other species.
Historically large stands (200+acres) above 4,000 feet had stands of ponderosa pine in LOS conditions. These stands remained in this large tree dominated condition for relatively long periods of time, with small patches or individual trees escaping low intensity fires and eventually replacing the large tree mortality. This helped maintain the density of large trees and in areas increased the numbers

sufficient to provide small patches (<20 acres) that had higher tree densities and canopy closures. The majority of the multi story LOS was above 5,000 feet. These conditions occurred in draws and on north aspects of what is currently Forest Service land. The majority of the LOS in the analysis area was in the single story condition impulses of understory canopy typically not obtaining more than 20 feet in height.

Single strata: these stands were ponderosa pine dominated stands and typically had fire return intervals of 0 – 25 years. These fires were low severity and burned in a mosaic fashion dependent on slope aspect and weather conditions. Low severity fires maintained these LOS stands by thinning under-story trees. These stands typically had open under-stories with pockets of small trees that were missed by a fire interval. Large tree (>21") tended to occur in clumpy patterns. While overall stand canopy closure may have been lower, within these clumps full crowns would abut or overlap. These conditions typically occurred in swales or other land features that would concentrate subsurface water and allowed for higher stocking rates. Large trees in and adjacent to these clumps that died were replaced by smaller trees that had escape a fire interval. The result would be that these clumps of large trees would be similar size but could be very different age classes. Individual tree or small group mortality of this type allow single strata stands to have large snags and maintain patches of large diameter trees with higher canopy closures.

Multi strata: these stands were a mixture of predominantly ponderosa pine and Douglas fir. They typically occurred at higher elevations on moister north slopes. Small openings were created through time by insects and disease. These areas became pockets of high snag and down log densities that provided unique habitats for a variety of species. Fire could have a variety of effects on the stand depending on the conditions the stand burned under. Because of the moist nature of the stands and density of trees with ladder fuels fires often consumed the entire stand or portions.

Snags and Downed Logs

John Day RMP sates, "Leave appropriate snags and/or large dead trees for wildlife, as per current BLM Snag Management Policy Guidelines and Agriculture Handbook No. 553 (USDA 1979, In USDI RMP – Record of Decision 1985).

Downed logs and snags are important to many animals as foraging, denning, and breeding sites. Some animals that heavily use downed logs are the striped skunk (Mephitis mephitis), marten (Martes americana), wolverine (Gulo gulo), pileated woodpecker (Dryocopus pileatus), and northern goshawk (Accipiter gentilis). Those that heavily use snags are the white-headed woodpecker (Picoides albolarvatus), pileated woodpecker (Dryocopus pileatus), pygmy nuthatch (Sitta pygmaea), brown creeper (Certhia americana), flammulated owl (Otus flammeolus), great gray owl (Strix nebulosa), screech owl (Otus kennicottii), and gray squirrel (Sciurus carolinensis).

Historically snag and down log levels occurred in differing abundance's across the landscape. Factors effecting the distribution and levels of snags were based ultimately on the location in the watershed, the amounts of precipitation, and the disturbance factors at work at any given time. Just as these factors influenced the seral structural conditions of plant communities across the landscape they also affected the number and distribution of snags and down logs. The processes that lead to standing and down dead trees can be lumped into two main categories; those that create large fairly contiguous areas of dead trees and those that kill individual or small groups of trees. The following categorical lists will identify some of the processes that created snags and down logs. It is important to remember that any number or combination of factors may take place to create tree mortality.

Broad scale mortality: fire, insect epidemics, wind, volcanoes, flooding

Individual or small group mortality: fire, endemic insect activity, root disease, mistle toe, inter and intra specific competition, wind, animal damage, flooding, etc.

Stands that went through broad scale mortality events had large amounts of snags and down logs for a period of time. These conditions persisted and provided unique habitat conditions of optimal snag and log levels. These conditions occurred historically across the landscape and populations of dead wood dependent species thrived for a period of time. Depending on the site and climatelogical factors these conditions could persist until another stand developed in which case the relics of the previous stand add to the dynamics of the new stand, or fire may have removed some or all of the dead wood components in a given area.

It is important to recognize that both the broad scale mortality, individual tree, and small group mortality occurred throughout watersheds and landscapes at various scales, time frames, and locations. Both types of mortality create habitat conditions that have been exploited by various species.

This would require recognition of the fact that for recruitment of live trees greater than 21" dbh may take 100 – 200 years and the loss of down logs due to the fire would be replenished by snags falling. In many areas legal and illegal cutting of snags and down logs has reduced snag densities within 200 feet of roads. The analysis area is located in a remote area with lower potential for high impacts from woodcutters.

The following tables show a comparison of snag requirements identified by three separate sources: Thomas's Blue Mountain Guide, Ochoco National Forests Viable Ecosystems Guide, and ICBEMP.

PLANT ASSOCIATION DEFINITIONS – specific definitions used in this analysis are contained in Appendix A of the EA.

This Analysis	North Slopes	South Slopes	South Slope Rims	Valley Bottoms
ICBEMP	Moist Forest	Dry Forest-Grand Fir	Dry Forest-Douglas Fir	Moist Forest
Ochoco N. F.	Moist Grand Fir	Dry Grand Fir	Douglas Fir	Moist Grand Fir

TABLE 1 SNAG DENSITIES – All figures are number per acre

	Viable Ecosystems HRV Low	Viable Ecosystems HRV High	Viable Ecosystems HRV Low	Viable Ecosystems HRV High	ICBEMP	ICBEMP	Malhuer NF Thomas - 79' 100% BP	Malhuer NF Thomas - 79' 100% BP
Plant Association	10-20" dbh	10-20" dbh	> 20" dbh	> 20" dbh	10-20" dbh	>20" dbh	10-20" dbh	>20" dbh
North Slopes	4.48	10.24	1.58	5.01	6	1.5	1.66	.14
South Slopes	3.27	7.34	1	3.42	4	1	2.11	.14
South Slope Rims	1.47	3.42	.27	1.89	4	1	.14	.14

Valley Bottoms	4.48	10.24	1.58	5.01	6	1.5	1.66	.14

TABLE 2 DOWN LOG DENSITIES – All figures are linear feet per acre

Plant Association	Viable Ecosystems HRV Low	Viable Ecosystems HRV High	ICBEMP Distrubed	ICBEMP Min. Undistrubed	Thomas - 79' 100% BP
North Slopes	188	410	144	72	140
South Slopes	81	257	300	240	140
South Slope Rims	71	233	300	240	140
Valley Bottoms	188	410	144	72	140

Big Game

Rocky Mountain elk and mule deer are species of special interest to public land users and, as such, are species with emphases in the RMP. The analysis area is located in the Northside Wildlife Management Unit with an estimated population of ~ 2,000 elk and ~ 13,000 deer. Both are present and use the analysis area for rutting, calving, and fawning. Numerous wallows are associated with riparian areas. Habitats surrounding the analysis area contain much less hiding and thermal cover. Because of the escapement cover deer and elk remain in the analysis area during hunting seasons. This draws large numbers of hunters to this area.
Big game use riparian areas as key reproductive, foraging, and travel corridor sites. The high road densities associated with riparian areas is reducing the habitat security in this and surrounding areas. Open road densities in the analysis area are 9 miles per mile squared with the mechanical fire lines remaining open, some of these are on steep ground not accessible by pickup trucks. This reduces the habitat security and increases the potential for poaching. Prior to the fire lines being constructed the open road density was 2.54 within the analysis area.

The Interior Columbia Basin Review stratified road density levels as follows: none to very low (0 - .1 m/m2), low (.1 - .7 m/m2), moderate (.7 – 1.7 m/m2), high (1.7 – 4.7 m/m2), or extremely high (4.7+ m/m2). About 51 percent of the Interior Columbia Basin supports road densities estimated at the moderate or above level (Quigley and others 1996). The majority of the Central Oregon area was classified in the high to extremely high category.

Species like big game can adapt to predictable activities in specific areas but surprise encounters cause increased stress and may cause animals to move to other areas. This movement may cause greater risk of predation (Lyon 1979). In the Blue Mountains of Washington, Perry and Overly (1976) found reductions of deer use in habitat 1/8 mile from roads and reductions in elk use ½ mile from roads.

Dense cover and steep topography can increase the level of security and thus increase potential for use even in areas with higher road densities. Marginal thermal cover is defined as areas with canopy closure between 40 – 70% with optimal thermal cover being greater than 70%. Although not directly related, the denser the canopy cover the greater potential to provide screening (hiding cover) on distant slopes and greater canopy covers indicate multi strata canopy that provides ground level screening. Prior to the burn the analysis area had 57% of the area in 40-100% cover. After the burn the analysis area has 31%. Public lands receive heavy hunting pressure. BLM lands in Timber Basin provide dense cover allowing greater escapement potential for animals during hunting season.

Riparian, Neotropical Migrants, and Amphibians

Riparian habitats are vegetative communities or ecosystems associated with perennial, intermittent, or ephemeral surface or subsurface water (Krueper 1993). They are among the rarest habitat types in North America, constituting less than 5% of the continental land mass. Riparian ecosystems are critically valuable to wildlife in arid regions of the western United States. They are particularly valuable in the lowlands, primarily below 5,000 feet, where they provide direct sustenance for a variety of animal species. They also provide a connection between all other habitats, including mountains, forests, prairies, and deserts. Traditionally, lowland riparian ecosystems have been the western habitat type that is most heavily affected by human overuse, abuse, and neglect. Within the past 100 years, an estimated 95% of this habitat has been altered, degraded, or destroyed by a wide range of human activities. Nonetheless, up to 80% of vertebrate species in the arid West use western riparian habitats at some stage of their lives. The high density and diversity of wildlife within these habitats results from the availability of water and prey items, and from high vegetative density, diversity, and structure (Krueper 1993).

Riparian areas are the most critical wildlife habitats in the analysis area. Wildlife use streamsides as “connectors”, or travel lanes between forested habitats as well as for maternity sites, and safe zones. Large mammals, furbearers, and predators use riparian zones as travel corridors to and from summer and winter ranges and between feeding, resting, breeding, brooding, and rearing habitats (Brown, 1985). Riparian vegetation has been referred to as the aorta of and ecosystem because of its significance to the perpetuation of water, fish, wildlife, rangeland, and forest resources (Knopf, et al., 1990). Shrub conditions in riparian areas were especially critical due to the diversity of species that utilized these areas. Riparian areas in the watershed tend to have higher numbers of snags. These components in association with higher canopy closure levels allow riparian areas to function as connective (travel) habitat for a variety of species.

The following activities have altered riparian conditions: elimination of beaver, alteration of the hydrological function of streams, removal of natural fire, timber harvest, roading, dispersed recreation and camping, excessive grazing of cattle, and other man caused impacts. These alterations have affected the ability of the area to support many of the plant species and thus habitats that once occurred in the riparian zones. No research exists indicating road densities within riparian areas at which wildlife will still be able to effectively exploit

those habitats. Due to the importance and sensitivity of activities that wildlife used riparian areas for, it is felt that very low road densities within the riparian zones should exist.
Many neotropical migrants are being adversely effected on other portions of their yearly range. Conversion of southern forest lands and the use of pesticides in southern latitudes has caused drastic effects on many populations. The majority of neotropical species use in the analysis are would be associated with the riparian areas. The majority of the riparian habitats were not burned, but did have fire suppression activities within them.

Public land agencies are recognizing the importance of special habitat feature. Most special habitat features, unlike vegetation, cannot be created. Protection efforts for existing features and improved vegetative conditions associated with these features will increase their effectiveness as habitat.

Springs, down logs, and streams provides habitat for a host of amphibian species. Burned areas have chard logs and reduced vegetative canopy cover levels have reduced the potential for use by amphibians.

ALTERNATIVES COMPARISON (EFFECTS)

Introduction

When comparing effects of man induced change it is important to have a basic understanding of the natural processes and effects. Wildlife populations have and will continue to be affected mainly by the local climate, vegetation, topography, competition, predation, and disturbance factors. The effects of man induced change related to the silvicultural and other activities proposed in the alternatives will be measured against each other. Proposed actions associated with the alternatives will be viewed in the context of their potential for effects to the process and function related to wildlife habitat.
Wildlife habitats that are balanced, not to the reduction of any one species, will be better able to adjust to partial habitat reductions due to wildfires, windstorms, human activities, drought, flood, etc.. The ability for broad scale resilience will increase with the number and size of watersheds approached in this manner.

Threatened, Endangered, and Sensitive Sp.

TABLE 3 Summary of Conclusion of Effects to Listed and Special Status Species

	Wildlife	Listing	Alt. A	Alt. B	Alt. C	Alt. D
1	**Northern bald eagle**	**threatened**	NE	NE	NE	NE
2	**Canada Lynx**	**threatened**	NE	NLAA	NLAA	NLAA
3	Washington Ground Squirrel	federal candidate	NE	NE	NE	NE
4	Oregon Spotted Frog	federal candidate	NE	NE	NE	NE
5	Northern Goshawk	sensitive	NI	MIIH	MIIH	MIIH
6	Ferruginous Hawk	sensitive	NI	NI	NI	NI
7	American Perigrine Falcon	sensitive	NI	NI	NI	NI
8	Flammulated Owl (BM)	sensitive	NI	MIIH	MIIH	MIIH
9	White-headed Woodpecker	sensitive	NI	MIIH	MIIH	MIIH
10	Black-backed Woodpecker	sensitive	NI	MIIH	MIIH	MIIH
11	Three-Toed Woodpecker	sensitive	NI	NI	NI	NI
12	Pygmy Nuthatch (BM)	sensitive	NI	MIIH	MIIH	MIIH
13	Burrowing Owl	sensitive	NI	NI	NI	NI
14	Streaked Horned Lark	sensitive	NI	NI	NI	NI
15	Yellow-Billed Cuckoo	sensitive	NI	NI	NI	NI
16	Columbian Sharp-tailed	sensitive	NI	NI	NI	NI
17	Townsend's Big-eared Bat	sensitive	NI	MIIH	MIIH	MIIH
18	Fisher	sensitive	NI	MIIH	MIIH	MIIH
19	Upland Sandpiper	sensitive	NI	NI	NI	NI
20	Northern Pygmy owl (BM)	sensitive	NI	MIIH	MIIH	MIIH
21	Painted Turtle	sensitive	NI	NI	NI	NI
22	Western Pond Turtle	sensitive	NI	NI	NI	NI
23	Northern Leopard Frog	sensitive	NI	NI	NI	NI
24	Cope's Giant Salamander	assessment	NI	NI	NI	NI
25	Tricolored Blackbird (HP)	assessment	NI	NI	NI	NI
26	Western Sage Grouse	assessment	NI	NI	NI	NI
27	Pygmy Rabbit	assessment	NI	NI	NI	NI
28	Brazilian Free-Tailed Bat	assessment	NI	NI	NI	NI
29	Spotted Bat	assessment	NI	NI	NI	NI
30	Pileated Woodpecker	tracking	NI	MIIH	MIIH	MIIH

Determination for Federally Listed & Proposed Species
NE No Effect
NLAA May Effect - Not Likely to Adversely Affect
LAA* May Effect - Likely to Adversely Affect
BE Beneficial Effect

Determination for Special Status Species - sensitive
NI No Impact
MIIH May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species
WIFV* Will Impact Individuals or habitat with a consequence that the action may may contribute to a trend towards federal listing or cause a loss of viability to the population or species
BI Beneficial Impact

*Trigger for a Significant Action As Defined In NEPA
** Note: Rationale For Conclusion Of Effects Is Contained In The NEPA Document

FEDERALLY LISTED

Lynx (Lynx Canadensis)

For All Action Alternatives a determination of **MAY EFFECT - NOT LIKELY TO ADVERSELY AFFECT** was reached because:
1.) The analysis area is not within an identified Lynx Analysis Unit.
2.) The analysis does not contain lynx habitat.
3.) Incidental lynx moving through the area would be dispersing thus using atypical habitats. Activities in associated with all action alternatives could cause a shift in movement direction, but would have no effect on the population viability.

Applicable PDCs: **NONE**
Rational: **No Habitat exists thus the PDCs are not relevant.**

Coordination with Level 1 team or others: Based on the March 2001 mapping efforts, the Deschutes and Ochoco NFs and Prineville BLM requested informal consultation on the impacts of activities outside of an existing LAU. On May 24, 2001, the U.S. Fish and Wildlife Service concurred with the determination that the land management plans as amended may affect but are not likely to adversely affect the Canada Lynx.

Direct/Indirect Effects
The only potential for effects to lynx would be from project activities causing incidental disturbance to individual lynx dispersing in atypical habitats. If this were to occur the project area is less than 1 mile wide at any point and activities could easily be avoided.

Cumulative Effects
None

Mitigations
There are no mitigations recommended for removing, avoiding or compensating adverse effects to the species and it's population.

Bureau Special Status Species :

Townsend's Big Eared Bat (Plecotus townsendii):

For the Effects of Active Rehabilitation a determination of **May Impact Individuals or Habitat** was reached because:
1.) Rehabilitation efforts have the potential to displace roosting individuals (the project area has very low roosting potential and no use of the area would be expected if activities occur in the winter).
2.) Due to the lack of caves or buildings this areas highest potential for use is by foraging individuals. Foraging activities will not be disrupted due to project activities due to the bat's nocturnal foraging.
3.) There are no known hibernacula or maternity roosts within 10 miles of the analysis area.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:
4.) Same as #1, #2, and #3 above.
5.) Removing dead trees will not remove foraging habitat and roosting potential in snags is reduced due to the lack of associated canopy cover.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:
6.) Same as #1, #2, #3, and #4 above.
7.) Removing green trees reduces the roosting potential; however, the greatest potential is in trees < 21" dbh which will not be removed in this alternative.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:
8.) Same as #1, #2, #3, and #4 above.
9.) Removing green trees will slightly reduce roosting potential. Roosting in trees is thought to be rare. Slight reductions in roosting capacity of the area will not reduce habitat capability or contribute to a trend towards federal listing or loss of viability to the population or species.

Direct/Indirect Effects
The fire burned across some seasonal streams an opened the canopy at these points. Townsend's forage in forested habitats primarily utilizing small watering sources. Ponded water is a key foraging location for Townsend's. The project area has a number of springs and one man-made pond. Restoration activities in the riparian areas will improve vegetative conditions to support a diverse host of insect species.

Cumulative Effects
Townsend's forage in openings associated with the forested habitats. The reduction of vegetation within the burn area has the potential to increase the amount of surface water associated with streams and springs in the analysis area which would improve foraging opportunities by increasing insect populations.

Mitigations
There are no mitigations recommended for removing, avoiding or compensating adverse effects to the species and it's population.

Northern Goshawk (Accipiter gentilis):

For the Effects of Active Rehabilitation a determination of **No Impact** was reached because:

1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed and riparian planting will improve foraging habitat.
3) There are no known Post Fledging Areas (PFA) within the analysis area.
   Surveys have not been completed a pair of goshawk or coopers hawk (positive identification could not be determined) were observed on the northern portion of the analysis area. It's not known if the individuals were using the analysis area or the area to the north for nesting. The analysis area is probably being used as a portion of these birds home range.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:

4) Same as #1, #2, and #3 above.
5) Removing dead trees will not remove foraging habitat and roosting potential in snags is reduced due to the lack of associated canopy cover.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:

6) Same as #1, #2, #3, and #5 above.
7) Removing green trees may open the canopy sufficient that it won't function as reproductive habitat until the canopy closure again increases. Harvest units will remain as potential foraging habitat and would enhance nesting potential in the future. Without survey it is impossible to predict if a nest is within one of the proposed harvest units. All nest trees identified during marking will remain. Contract provisions allow for modification if a sensitive species is located.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:

8) Same as #1, #2, #3, and #5 above.
9) Removing green trees may open the canopy sufficient that it won't function as reproductive habitat until the canopy closure again increases. Harvest units will remain as potential foraging habitat removing the largest trees would delay the sites potential for nesting use in the future. Without survey it is impossible to predict if a nest is within one of the proposed harvest units. All nest trees identified during marking will remain. Contract provisions allow for modification if a sensitive species is located.

Direct/Indirect Effects

Project activities will occur outside of critical reproductive periods. No large trees with nesting potential would be cut down, and snag and down log levels would be enhanced. Riparian planting will enhance prey species habitats. The reduction of large green trees associated with Alternative C will reduce the potential for nesting. The more acres treated the greater the potential for removal of existing nests.

Acres harvested using a helicopter usually disturb the ground cover substantially less than treatments like tractor and skyline. Many goshawk prey species rely on the ground vegetation. Treating too many acres (especially with a ground based harvest system) within PFAs could have negative impacts to prey species and ultimately to the ability of goshawk to successfully produce young.

Snags and down logs are key habitat components to goshawk habitat. See the snag and down log section of this report for effects of the alternatives to snags and down logs.

Cumulative Effects

Past logging activities especially on surrounding private lands have reduced the total amount of potential nesting habitat, but created foraging areas.

The U.S. Fish and Wildlife determined that the population of northern goshawk in the lower 48 states did not warrant listing under the Endangered Species Act in 2000, with this decision being upheld in Federal Courts in 2001.

Mitigations

Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

Northern Pygmy Owl (Glaucidium gnoma) and Flammulated Owl (Otus flammeolus):

For the Effects of Active Rehabilitation a determination of **May Impact Individuals or Habitat** was reached because:

1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed and riparian planting will improve foraging habitat.
3) There are no known nests within the analysis area.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:

4) Same as #1, #2, and #3 above.
5) Removing dead trees will not remove foraging habitat. Reducing snag numbers will reduce the number of potential roost and nest trees; however, snag and down log levels will be greater than the high level of variability.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:

6) Same as #1, #2, #3, and #4 above.
7) Removing green trees and opening stands while protecting the large structure will benefit foraging and reproductive habitats.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:

8) Same as #1, #2, #3, and #4 above.
9) Opening stands will benefit foraging potential but removing large structure will decrease the potential for use as reproductive habitat.

Direct/Indirect Effects
Pygmy owl and flammulated owl both use openings in the forest for foraging and hollows in live and dead large diameter trees for reproduction. The restoration efforts will improve foraging potential and will not remove any potential reproductive habitat. Project activities will occur outside of critical reproductive periods.

Alternative C and D propose green tree harvest but with different objectives. Alternative D will retain the large structure utilized by these species, while Alternative C will preserve a small component of large trees.

Snags and down logs are important for maintaining prey populations and potential nesting structures. All alternatives propose to leave snag numbers within the historic range of variability. The more acres treated the greater the potential for removal of existing nests.

Cumulative Effects
Past logging activities especially on surrounding private lands have reduced the total amount of potential nesting habitat, but created foraging areas.

Mitigations
Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

White-headed Woodpecker (Picoides albolarvatus):

For the Effects of Active Rehabilitation a determination of **No Impact** was reached because:
1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed.
3) There are no known reproductive pairs in the watershed.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:
4) Same as #1, #2, and #3 above.
5) Foraging and reproductive activities are associated with live trees.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:
6) Same as #1, #2, #3, and #5 above.
7) Green tree harvest will open stands and allow the remaining trees to become large faster. This alternative doesn't propose to remove any trees greater than 21" dbh so foraging and reproductive habitat will remain.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:
8) Same as #1, #2, #3, and #5 above.
9) Harvest in unburned stands will remove some of the large structure will reduce the amount of foraging and reproductive habitat. The burn reduced the amount of potential habitat and harvesting pine trees greater than 21" will further reduce habitat. The level of reduction could reduce the carrying capacity of this watershed, but should not be significant enough to cause the species to trend toward Federal Listing.

Direct/Indirect Effects
Project activities associated with salvage and harvest in Alt. C and D have the potential to disrupt habitats; however, activities will be outside of critical reproductive periods.

Salvage activities are not expected to further reduce habitat. Because of its association with live trees, this species does not appear to be closely associated with severely burned habitats. Hutto (1995) did not detect white-headed woodpeckers on any of 33 burned sites in the Northern Rockies, and none were detected on year after a fire in northeastern Oregon (Sallabanks 1995).

Harvesting green trees greater than 21" dbh in Alt. C will reduce 131 acres habitat capabilities in the analysis area. The more acres treated the greater the potential for removal of existing nests.

Cumulative Effects
The Timber Basin Fire Restoration is a small inclusion of special habitat. Surrounding private lands have removed or are expected to remove most of the large tree component within the next few years. This will further reduce the habitat potential in the area and increase the importance of the analysis area as necessary habitat.

Mitigations
Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

Black-backed Woodpecker (Picoides arcticus):

For the Effects of Active Rehabilitation a determination of **No Impact** was reached because:
1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed.
3) There are no known reproductive pairs in the watershed.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:
4) Same as #1 and #3 above.

5) Foraging occurs in high concentrations of high density snags < 20"dbh. Some of this habitat will be removed through harvest activities. Snag levels will be left in pockets and at a level 1.5 times the high end of HRV.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:

6) Same as #1, #2, and #5 above.
7) Harvesting in unburned stands will reduce the canopy cover and possibly the snag density. This will slightly reduce the potential for use as reproductive habitat. Snag levels will still be maintained at the high end of HRV.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:

8) Same as #1, #2, and #5 above.
9) Harvesting in unburned stands will reduce the canopy cover and possibly the snag density. This will slightly reduce the potential for use as reproductive habitat. Snag levels will still be maintained at the low end of HRV.

Direct/Indirect Effects

Large-scale disturbance, such as fire or windthrow, facilitates wood-bores and often leads to population increases of black-backed woodpeckers (Yunick 1985). Black-backed woodpeckers prefer to nest in smaller (<20" dbh, averaging about 12" dbh), recently dead and, therefore, harder trees (Bull 1980, Marshall 1992a, Saab and Dudley 1997). Black-backed woodpeckers selected nest sites with the highest density of trees (snags) and favored unlogged area of the burn over logged areas (Saab and Dudley 1997).

All proposed activities will be outside of critical reproductive periods. Rehabilitation efforts will no impact on foraging or reproductive habitat. The more acres treated the greater the potential for removal of existing nests.

Salvage activities will reduce the number of snags in the 9 – 12" dbh class from post burn but will maintain levels at 1.5 times the high end of variability. These sites should still provide habitat for black-backed woodpeckers. Green harvest in unburned stands surrounding the burn where nesting would most likely occur would be greatest in Alt. C and D respectively. Alt. C would leave snags at the low end of HRV and D would leave that at the high end of HRV. Higher snag numbers in the green stands adjacent to the burn would improve the potential to be used as nesting habitat and increase the potential of the analysis area to function as a source habitat for black-backed woodpeckers.

Cumulative Effects

Salvage and green tree harvest are expected on surrounding private lands within the next two years where the fire burned. Typically sufficient snag numbers are not left on private lands. This would reduce the function of the watershed as source habitat and make the areas on BLM managed lands that much more important as a habitat source. Green tree stands on BLM lands that are adjacent to private lands will be that much more important for reproductive habitat if private lands are not logged and maintain the current high snag densities associated with the burned.

Mitigations

Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

Pygmy Nuthatch (Sitta pygmaea):

For the Effects of Active Rehabilitation a determination of **No Impact** was reached because:

1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed.
3) There are no known reproductive pairs in the watershed.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:

4) Same as #1, #2, and #3 above.
5) Foraging and reproductive activities are associated with live trees.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:

6) Same as #1, #2, #3, and #5 above.
7) Green tree harvest will open stands and allow the remaining trees to become large faster. Pygmy nuthatch prefer open stands with large trees and forage on snags. This alternative doesn't propose to remove any trees greater than 21" dbh so foraging and reproductive habitat will remain.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:

8) Same as #1, #2, #3, and #5 above.
9) Harvest in unburned stands will remove some of the large structure will reduce the amount of foraging and reproductive habitat. The burn reduced the amount of potential habitat and harvesting pine trees greater than 21" will further reduce habitat.

Direct/Indirect Effects

Project activities associated with salvage and harvest in Alt. C and D have the potential to disrupt habitats; however, activities will be outside of critical reproductive periods.

Salvage activities will reduce the amount of snags in the burned area, but is not expected to reduce habitat due to the number that will be remaining. Reduced cover in the burned areas will make individuals more susceptible to predation.

Harvesting green trees greater than 21" dbh in Alt. C will reduce 131 acres habitat capabilities in the analysis area. The more acres treated the greater the potential for removal of existing nests. Harvest activities in Alt. D will open the stands while maintaining the large structure that favors pygmy nuthatch.

Cumulative Effects
The Timber Basin Fire Restoration is a small inclusion of special habitat. Surrounding private lands have removed or are expected to remove most of the large tree component within the next few years. This will further reduce the habitat potential in the area and increase the importance of the analysis area as necessary habitat.

Mitigations
Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

Pacific Fisher (Martes pennanti):

For the Effects of Active Rehabilitation a determination of **May Impact Individuals or Habitat** was reached because:
1) Individuals using the project area for incidental foraging would be displaced by project activities; however, sufficient foraging habitat exists to the east of the analysis area.
2) Rehabilitation will decrease recovery times to provide foraging habitat and riparian planting will increase prey habitat potential.
3) Closing the mechanical fire lines will improve habitat security.

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:
4) Same as #1, #2, and #3 above.
5) Removing dead trees will reduce future down log levels. High concentrations of down logs (< 7 " dbh – which will be left) provide subnivial habitats critical winter foraging. Large snag levels with potential to be used for denning would remain at 1.5 time the high range of historic variability.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:
6) Same as #1, #2, #3, and #4 above.
7) Opening stand structure will reduce the potential to be used as habitat. Retention of the large tree structure will allow for denser canopy covers more rapidly. The development of secondary canopies take far less time than over-story canopies.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:
8) Same as #1, #2, #3, and #4 above.
9) Same as #7; however not as much of the large tree component will be retained.

Direct/Indirect Effects
Activities associate with the restoration efforts will enhance the potential of the area to be used by fisher; however activities could cause them to avoid the area until plant communities are reestablished.

Building roads associated with Alternative C and the increased number of skid trails associated with tractor logging increases the potential for greater motorized access in the area. Harvest green tree harvest associated with Alternatives D and C will reduce the level of security cover respectively within green tree stands. Snags and down logs provide critical habitat components when associated with dense coniferous over-stories. See the Snag and Down Log section of this report for comparison of alternatives.

Compacting the snow due to over snow skidding would restrict movement of small mammals. The alternatives vary in their amount of area effected by over snow skidding with Alternative C having the highest. Helicopter logging would not result in the same compaction. Snowfall subsequent to the haul would restore habitat effectiveness over time. The effects are not expected to reduce the ability of individuals using the area to survive the winter.

Cumulative Effects
Surrounding habitats are being managed for maximum timber production on private lands, which will have less down logs and canopy cover for potential reproductive habitat. The analysis area is not sufficient in size to provide enough habitat for a reproductive pair.

Mitigations
There are no mitigations recommended for removing, avoiding or compensating adverse effects to the species and it's population.

Pileated Woodpecker (Dryocopus pileatus):

For the Effects of Active Rehabilitation a determination of **No Impact** was reached because:
1) Rehabilitation efforts will occur outside of reproductive periods.
2) No additional reproductive habitat will be removed.
3) There are no known reproductive pairs in the watershed..

For the Effects of Salvage & Rehabilitation Actions a determination of **May Impact Individuals or Habitat** was reached because:
4) Same as #1, #2, and #3 above.
5) Removing dead trees will reduce foraging potential; however snags will be retained at 1.5 times High level of HRV. Nesting potential in the burn areas was removed due to the loss of canopy.

For Alternative D a determination of **May Impact Individuals or Habitat** was reached because:
6) Same as #1, #2, and #5 above.
7) Opening stands that are a mix of ponderosa pine and Douglas fir will reduce the multi strata component and reduce security cover for pileated woodpeckers. The majority of the stands identified contain ponderosa pine. This alternative will retain all large tree structure used by pileated and will leave snags in harvest units at the high end of HRV. Stands will remain as foraging habitat and potential nesting habitat.

For Alternative C a determination of **May Impact Individuals or Habitat** was reached because:
8) Same as #1, #2, and #5 above.

9) Green tree harvest will reduce canopy closures below needed levels for nesting habitat and will drastically reduce foraging security. Removing the large trees will reduce the potential of the area to provide foraging or reproductive habitat in the future.

Direct/Indirect Effects

Snags and down logs are key habitat components to pileated habitat. See the snag and down log section of this report for effects of the alternatives to snags and down logs.

Pileated woodpecker may use a burned area for foraging if it is within their home range and they have adequate closed-canopy nesting and roosting habitat also available in the area, but they are not necessarily attracted to a burned area and are not expected to nest there.

Harvesting green trees greater than 21" dbh in Alt. C will reduce 131 acres habitat capabilities in the analysis area. Activities will be outside of critical reproductive periods. The more acres treated the greater the potential for removal of existing nests.

Cumulative Effects

Salvage and green tree harvest are expected on surrounding private lands within the next two years where the fire burned. Typically sufficient snag numbers are not left on private lands. This would reduce the function of the watershed as source habitat and make the areas on BLM managed lands that much more important as a habitat source. Green tree stands on BLM lands that are adjacent to private lands will be that much more important for reproductive habitat if private lands are not logged and maintain the current high snag densities associated with the burned.

Mitigations

Seasonal Restriction: between March 15 and September 30 – unless a wildlife biologist determines a waiver is warranted.

Large Structure Habitat

TABLE 4 - All figures are Acres

Species Composition Analysis	Pre Burn Analysis Area	Pre Burn BLM Lands	Post Burn Analysis Area Alt. A	Post Burn BLM Lands Alt. A	Analysis Area Alt. B	BLM Lands Alt. B	Analysis Area Alt. C	BLM Lands Alt. C	Analysis Area Alt. D	BLM Lands Alt. D
rock-spar	9	2	9	2	9	2	9	2	9	2
grass	13	4	785	465	13	4	13	4	13	4
shrub	17	9	15	8	40	28	40	28	40	28
juoc	106	54	90	45	90	45	90	45	90	45
Ponderosa Pine (Pipo)	1045	613	632	384	1125	662	1125	662	1153	690
juoc-pipo	283	141	197	105	197	105	197	105	197	105
mix1(pine & fir)	532	406	278	220	532	865	532	865	504	837

Assuming 20 ac. shrub planting, replanting intense burn at 60% pine, 40% mixed (BLM lands only). Treatment in Alternative D will move 28 ac. from a mixed condition to pine dominated.

TABLE 5 – All figures are Acres

Structure Analysis	Analysis Area Pre Burn	BLM Pre Burn	Analysis Area Post Burn	BLM Post Burn	Analysis Area Alt. C	BLM Alt. C	Analysis Area Alt. D	BLM Alt. D
Seed and Sap	50	21	818	479	818	479	818	479
Small	1239	785	760	497	800	537	728	465
Medium	716	420	427	250	387	210	459	282
Large	0	0	0	0	0	0	0	0

Seed and Sap = (grass, forb, shrub, or trees < 3 feet tall)
Small = 10 inch dbh to 14.9 inch dbh
Medium = 15 inch dbh to 19.9 inch dbh
Large = 20 inch dbh to 29.9 inch dbh

Alt. values reflect composition after plantings become established. Alt. A - nature would dictate what species composition returns, B would mimic pre-burn. Alt. B, C, & D propose planting 20 ac. of shrubs. Juniper will not be replanted.

There are 236 ac. of medium sturcture with a large tree component, these stand could become large structure dominated within 50 years. Alt. C is the only Alt. to affect this and would result in 185 ac. remaining.

Direct/Indirect Effects
Restoration activities will decrease the time frame for stocking of the burned areas to become large structure stands. Salvage activities will remove some of the large structure that would function as snags and down logs in the burned area. All alternatives leave 1.5 times the high end of historic range of variability for these plant associations. Snags and down logs are an important component in large structure stands, the effects by alternative to snags and down wood are described in the Snag and Down Log section of this document. Removing high levels of dead material from the burned areas will reduce the potential for future high intensity burns that would further prolong the development towards large structure and would have the potential to further reduce large structure in the analysis area by burning remaining green stands with large structure.

Green harvest in the unburned areas under Alternative C will further reduce the amount of large structure in the analysis area and watershed. Increased compaction associated with tractor logging has the potential to reduce growth rates and prolong development of large structure. Green harvest in unburned areas under Alternative D would seek to enhance growth potential of single story ponderosa pine stands. The large structure component that exists in these stands will remain after harvest. Stands will be commercially thinned to remove trees in the 9 – 18" dbh range to promote the growth of the largest trees available in the stand.

Cumulative Effects
Because of the existing situation on private land and the high likelihood of management practices that would exclude large structure on the surrounding lands the amount of large structure present in the analysis area becomes very important to a number of wildlife species. Action alternatives that propose roading have the potential to break up the character of undisturbed habitats. See the big game section of this report for the amounts of road construction and reconstruction by alternative. The action alternatives would all reduce the potential for catastrophic fire and insect epidemics. This would reduce the likelihood of further reductions in the amount of large tree structure.

As noted earlier in this report the several large scale analysis, including ICBEMP have found that the amount of large structure single strata ponderosa pine stands are well below historic levels.

Mitigations
There are no mitigations recommended for removing, avoiding or compensating adverse effects.

Snags and Down logs

Direct/Indirect Effects
The "patchiness" of fire is a desirable characteristic, and many species depend on the environmental influences that fires create (Beschta, et. al. 1995). All alternative prescribe that snags will be left in clumps and scattered through out the units. All alternatives call for the number of snags to be left after harvest to be prescribed and then snags counted on the ground during marking to insure that sufficient snags exist in the units. Because of this method, the number of existing snags is not as important. If a unit is found to have insufficient snag or down log numbers during marking no snags will be removed.

The restoration efforts should not reduce the amount of snags in the analysis area and will decrease the recovery time of timbered stands allowing for trees of sufficient size to provide snags sooner. All harvest activities associated with salvage will leave 1.5 times the high end of historic range of variability. This will provide increased numbers of snags with potential to be used as source habitats for woodpeckers and subsequently for secondary cavity users. Because salvage activities would occur in areas where the majority of live trees were killed by the fire there will be a period of 100 – 200 years prior to sufficient size trees to provide large snags. Many of the snags (especially those in the smaller size classes) will fall to the ground within the next 10 years. When snags begin falling to the ground the amount of down wood will increase.

Alternative D proposes to harvest 103 acres of unburned areas with snag retention at the high end of historic range of variability (see TABLE 1). Alternative D also proposes to leave all down logs in green tree harvested areas. With the reduction of down wood in the analysis area due to the fire the remaining down wood becomes more important for a variety of species habitats including: small mammal habitat and woodpecker foraging areas.

Alternative C proposes to harvest 131 acres of unburned areas with snag retention at the low end of historic range of variability and down log retention at the highest level prescribed by ICBEMP. Higher snag numbers than normal will exist in the burned areas, and snag and down log numbers will be within but at the low end of historic levels in unburned harvest areas.

For safety reasons helicopter logging often requires additional snags to be felled. This should be considered during timber marking to reduce the potential of this occurring. Tractor logging will require additional miles of skid trail, which will also increase the possibility of snags felled for safety reasons.

TABLE 6

Snag Allocation by Alternative	Non Intensly Burned Alt. B	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh	Non Intensly Burned Alt. C	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh	Non Intensly Burned Alt. D	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh
Plant Association	Acres	High HRV	High HRV	Acres	Low HRV	Low HRV	Acres	High HRV	High HRV
Grand fir/Elk Sedge	49	220	245	24	108	38	47	211	235
Mixed Pine/Fir Sedge	36	86	53	22	23	4	37	88	55
Mountain Very Shallow	12	41	23	12	18	3	12	41	23
Ponderosa Pine/Elk Sedge	214	511	317	202	214	38	175	418	259
Total	311	858	638	260	363	84	271	758	572
	Intensley Burned All Alts.	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh	Green Harvest Alt. C	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh	Green Harvest Alt. D	# of Snag to Leave <20" dbh	# of Snag to Leave >20" dbh
Plant Association	Acres	1.5 times High HRV	1.5 times High HRV	Acres	Low HRV	Low HRV	Acres	High HRV	High HRV
Grand fir/Elk Sedge	19	128	143	64	31	11	7	31	35
Mixed Pine/Fir Sedge	118	424	262	35	0	0	0	0	0
Mountain Very Shallow	7	36	20	0	0	0	0	0	0
Ponderosa Pine/Elk Sedge	324	1163	719	32	104	19	98	234	145
Total	468	1750	1144	131	135	30	105	266	180
Prescribed Numbers Per Acre	1.5 times High HRV	1.5 times High HRV	High HRV	High HRV	Low HRV	Low HRV	Summary Total Snags Alt. B	Summary Total Snags Alt. C	Summary Total Snags Alt. D
	<20" dbh	>20" dbh	<20" dbh	>20" dbh	<20" dbh	>20" dbh	4391	3341	4225
Grand fir/Elk Sedge	6.72	7.52	4.48	5.01	4.48	1.58		165	446
Mixed Pine/Fir Sedge	3.59	2.22	2.39	1.48	1.06	0.19	1st numbers are salvage area		
Mountain Very Shallow	5.13	2.84	3.42	1.89	1.47	0.27	2nd numbers are green tree area		
Ponderosa Pine/Elk Sedge	3.59	2.22	2.39	1.48	1.06	0.19			

Cumulative Effects
No plans exist to harvest additional areas on BLM lands in any of the effected watersheds. Harvest on adjacent private lands is expected to occur within the next two years. Snag and down log levels will be higher than prior to the burn on private lands that burned, however it is expected that the majority of these will be very small diameter and will likely fall within seven years. Surrounding habitats are predominantly juniper woodlands and shrub steppe. Habitats to the east do provide potential for ponderosa pine, western tamarack, and Douglas fir snags.

Insect impacts will be reduced due to salvage activities on private and public lands. Additional trees will be killed by insects; however, the timing and amount of harvest will reduce the risk of large scale outbreaks.

Mitigations
When snags are felled for safety concerns an alternate snag will be retained. Preclude woodcutting in the analysis area for a period of 10 years. This will protect the snags left to meet management objectives.

Big Game

Direct/Indirect Effects
Project activities associated with all alternatives will occur outside of critical reproductive activities, and the project area is too high of elevation to function as critical winter range habitat.

The burn created large areas of high value big game foraging opportunities. Habitat security is an important factor, both cover and road density effect habitat security. Restoration efforts should enhance the conditions for big game by improving habitat security by closing mechanical fire lines, planting shrubs and riparian hardwoods, and revegetating burned areas. Salvage activities if done with a tractor will create additional skid roads with the potential to be used by the public even after closure efforts. Alternatives C creates the most additional roads and skid trails (All roads constructed will be closed after harvest) that could become used by the public as roads if road

closures are not effective (see cumulative effects). Alternative D proposes to create no new roads, but if tractor logging is used skid trails would still have the potential of being used as roads by the public. Alternative D proposes to close 1.64 miles of roads that existed prior to the burn and will result in a road density of 2.04 m/m^2 after project activities are complete. Alternative C proposes the construction or reconstruction of 2.07 mile of new road for harvest, these roads will be closed after harvest with a resultant road density of 2.54 m/m^2.

TABLE 7

Road Density Analysis	Density before the Burn	Density w/ Dozer Lines	New Road Construction	Road Closures	Density w/ New Roads	Density w/ Dozer line & New Roads	Density after closures
Alternative A	2.54	9	0	0	2.54	9	9
Alternative B	2.54	9	2.07 miles	0	3.17	9.63	2.54
Alternative C	2.54	9	2.07 miles	0	3.17	9.63	2.54
Alternative D	2.54	9	0	1.64 miles	2.54	9	2.04

Unless specified all numbers are miles per mile squared.

The burn reduced the amount of cover in the analysis area and watershed. Green tree harvest will further reduce cover values. Prior to the burn there were 850 acres of marginal cover 40 – 70% and 287 acres of optimal >70%. After the burn there are 483 acres of marginal and 7 acres of optimal. Alternative D and C will reduce cover values on 103 and 131 acres respectively. The extent of harvest in Alternative D is not expected to reduce acres below the 40% canopy cover level. Alternative C will reduce most acres slightly below or near the 40% canopy cover level.

A minimum of 200 feet is required to provide hiding cover. Alternative D and C provide hiding cover buffers (300 and 200 feet respectively) around springs to provide security habitat associated with potential elk wallowing activities.

TABLE 8

Canopy Cover Analysis	Analysis Area Pre Burn	BLM Lands Pre Burn	Analysis Area Post Burn Alt. A & B	BLM Lands Post Burn Alt. A & B	Analysis Area Alt. C	BLM Lands Alt. C	Analysis Area Alt. D	BLM Lands Alt. D
0 - 40% (forage)	868 (43%)	439 (36%)	1379 (69%)	767 (63%)	1505 (75%)	893 (73%)	1384 (69%)	772 (63%)
40 - 70 % (marginal cover)	850 (43%)	545 (45%)	483 (24%)	330 (27%)	483 (24%)	330 (27%)	483 (24%)	330 (27%)
70% plus (satisfactory cover)	287 (14%)	241 (19%)	143 (7%)	127 (10%)	17 (1%)	1 (.1%)	138 (7%)	122 (10%)

Forage/Cover distributions where the amount of land in forage (<40% canopy cover) is above 60% of the land base typically becomes less effective due to the loss of security factors.

Cumulative Effects

Habitats in the remainder of the watershed is typically much more open than that contained in Timber Basin. The surrounding habitats are a mixture of BLM and private lands. Private lands typically receive less hunting pressure than public lands due to limited access. Big game tag numbers in the area have gone down in the last several years.

In 1995 Havlick reviewed 802 road closure sites, of these only 27% fully closed the roads they were intended to close. If road closures within the analysis area are not successful habitat security will be reduced on terrestrial and riparian areas. The greater the miles of roads or mechanical fire line closed the greater the potential for public use at least on a portion of them.

Mitigations

Seasonal Restriction: between May 15 to June 30 for calving activities, Rut - September 1 through October 15.

Riparian, Neotropical Migratory Birds, and Amphibians

Direct/Indirect Effects

Restoration efforts will decrease the recovery time of the riparian areas in the analysis area. The No Action alternative has the potential for damaging results to the streams in the analysis area due to the number of dozer lines adjacent to streams. Restoration of riparian habitat will benefit a host of species including neotropical migratory birds and amphibian species. The development of the riparian shrub and hardwood communities is one of the big limiting factors to Neotropical Migratory Bird habitat. Additional shrubs and hardwoods would benefit many wildlife species. Restoration activities will occur outside of critical reproductive periods for neotropical migratory birds and amphibian species. Mechanical activities will be restricted to already disturbed areas. There is the potential that

incidental individual amphibian species could be killed during restoration activities; however, this will not be significant enough to effect local populations survival.

Salvage activities will not occur in the riparian areas. Due to the intensity of the burn area there is very little structural diversity at this point for use by neotropical birds. Restoration activities will decrease the time to return these areas to a more diverse condition. Snags are a critical habitat component for some neotropical migratory birds. See the Snag and Down log section of this report for the analysis of snag levels. The burned areas have very little canopy cover remaining and most if not all down logs were consumed in the burn. Amphibian species utilizing the area before the burn would have been associated with microhabitats that retained higher moisture levels.

Green tree harvest will not occur in riparian areas in any of the alternatives. Silvicultural prescriptions for the thinning will be modified to leave small patches of dense fir trees for some species of birds that like thicket conditions in all alternatives. Large diameter trees and snags are important to several species of neotropical migratory birds. Alternative C will reduce the large tree component in unburned stands and would leave the fewest snags of all alternatives. Alternative D would disturb additional acres of unburned habitat through harvest activities; however, the large tree component would be retained.

No road construction is proposed within RHCAs in any of the alternatives. For every mile of roading in a riparian area there are 145.5 acres of habitat security that are affected. Restoration activities propose to close all mechanical fire line. In 1995 Havlick reviewed 802 road closure sites, of these only 27% fully closed the roads they were intended to close. There are 2.43 miles of road or mechanical fire line within the Riparian Habitat Conservation Areas (RHCA). There are 31.38 miles of road or mechanical fire line within ¼ mile of riparian habitats. Alternative D proposes to close 1.64 miles of road that cross or are adjacent to riparian areas.

Cumulative Effects
Throughout much of the west unique habitats are being lost to conifer invasion. Lower in the Franks Creek Watershed intensive cattle grazing, logging, and road construction have cause head cutting in the streams and the loss of much of the riparian vegetation. Cut banks and intensive grazing are precluding the reestablishment of hardwood species important to neotropical migratory birds. The reduction of foliar cover and reduced wetted width has reduce potential habitat for amphibian species.

Project activities are expected to occur in the fall of the year just prior to many species of amphibians going dormant for the winter or dieing of natural causes.

Mitigations
Seasonal Restriction: between May 1 and September 30.

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RATIONAL FOR DESIGN ELEMENTS IN THE ALTERNATIVES FOR WILDLIFE

'Dead' Tree: >=21" DBH <=10% live crown; <21" DBH <=30% live crown

The probability of initially surviving a fire is related to the extent of damage to the crown, cambium, and roots. Cambial injury is significant when all four quadrants are injured in a tree with greater than 50% crown scorch (Mann and Gunter 1960). Salman (1934) found with 75-100 percent crown scorch resulted in moderate to heavy cambium injury. Miller and Keen (1960) found 19-87% of trees with >75% crown scorch were killed by western pine beetle. Ponderosa pine can survive summer or autumn fires even if much of the crown is scorched, as long as the terminal bud and enough lateral buds survive, and if the trees are not successfully mass attacked by western and / or mountain pine beetles. Caution should be taken to not salvage an excessive number of lightly scorched ponderosa pines, and to avoid salvage that is based solely upon diameter (Flanagan 2001).

As many as 50% of trees with less than <30% green crown may survive. Leaving trees >21" dbh with >10% live crown provides the greatest potential for retention of large trees existing on the site.

Snags in intensely burned areas: In Forest types Dry Grand Fir and Moist Grand Fir, prescribe a number per acre equal to 1.5 times or 150% high end natural variability.

Snags are being left at the 1.5 time the high end of natural variability due to the loss of green trees that would eventually become snags and the extended time frame to establish green stands capable of providing snags.

Snags in non-intensely burned areas: In Forest types Dry Grand Fir and Moist Grand Fir, prescribe a number per acre equal to 100% high end natural variability.

Snags are being left at the highest end of natural variability in the green areas to mitigate the loss of recruitment potential in the burned areas but not at the 1.5 times level because green trees remain capable of becoming snags.

Downed logs: Leave all downed logs across project area.

The fire consumed most of the down logs in burned areas. Remaining down logs will be left to provide nursery sites, micro habitats, and organic material. In several years snags will begin to fall and provide additional down logs.

Retain 5% of all unburned thicket areas (areas of dense understory).

Retaining dense thickets of small trees provides nesting habitat for neotropical migratory birds and micro habitats.

Precommercial thin in stands with large tree component and dense seedling/sapling areas take trees <=9" DBH leaving a live tree spacing of 16-20', Commercial thin understory – trees <=21" in stands with 40-60' tall trees of the same age class, leave a basal of 60-80.

Leave un-entered all mixed conifer stands with multiple canopies (i.e. stands with an evenly defined age class structure exhibiting several layered canopies within the stand)

No firewood cutting within burned area for 10 years, slash at decking and landing areas may be opened for cleanup through firewood cutting of already felled and left timber.

Snag and down log numbers are being prescribed to meet resource objectives, firewood cutting has the potential to reduce these numbers below desired levels. Within 10 years the majority of snags below 9" dbh will fall to the ground at which time removing them through woodcutting would

reduce fuel loads without impacting snag and down log levels.

Snags will be left in a combination of pockets and scattered spacing.

Snags occurred primarily in clumps following fires and many disturbance adapted species associated with fires require snags in dense clumps. Foraging activities for other species and habitat diversity are increased by leaving scattered snags throughout the units.

100' buffer on 75% of undisturbed, unburned rock outcroppings, a rock outcrop is an area of exposed rock with a very steep to vertical slope that is >=10' high.

Unique habitats created by geomorphic features and occupy a very small percent of the total forest land base, yet they are disproportionately important as wildlife habitats. Each unique habitat has at least one animal that is highly adapted to it as a place in which to live. Each habitat also concentrates and supports a unique animal complex. Adjacent plant communities provide the source of food for the animals, and snags along the tops of cliffs are essential perches for raptors. Therefore, plant communities adjacent to these habitats should be stabilized as much as possible. (Thomas, et al. 1979).

Addendum to Wildlife Report for Timber Basin

Fence Reconstruction Standards to be included in the EA.
The John Day RMP states: "Existing fences that create wildlife movement problems will be modified."
Fences that will be rebuilt under all alternatives will be rebuilt to standard Bureau wildlife specifications.

Validation for use of snag numbers in relation to Resource Management plan (for the EA):

The John Day RMP states: "Leave appropriate snags and/or large dead trees for wildlife, as per current BLM Snag Management Policy Guidelines and Agriculture Handbook No. 553 (USDA 1979)."

Agriculture Handbook No. 553, Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington (Thomas 1979). Thomas recognized that snag management was important for a variety of reason and wildlife species. Snag management guidelines in Thomas were developed to address two factors (1) the increased emphasis of recent Federal laws on management of publicly owned forest lands for wildlife and (2) the recognition that birds may play a significant role in regulation of insect populations. Most of the snag-dependent birds and mammals in the Blue Mountains are insectivorous and represent a major portion of the insectivorous forest fauna. Snag management guidelines were developed to be used when addressing timber harvest activities and thus assume a level of green tree replacement.

Thomas's snag guidance further states:

"The forest manager must consider snag requirements on a community-by-community basis. Development of criteria that are to general may lead to an over supply of snags in one timber type and a grossly inadequate supply in another."

"As increase in the overall snag management level is likely to increase the probability that viable populations of snag-dependant species will continue to exist in an area."

"The retention of snags is essential. This means that salvage logging of some commercially valuable trees must be forgone to meet wildlife habitat goals. The direction to go is a management decision."

Snag management levels and distribution were identified using the most recent scientific data regarding snag densities with the recognition of the uniqueness of the burned community, surrounding habitats, and management allocation.

Snag numbers in all alternatives recognized that in the intensely burned areas the majority of live trees were killed by the fire thus there will be a period of 100 – 200 years prior to sufficient size trees to provide large snags. Leaving higher snag numbers in the intensely burned areas will provide increased numbers of snags with potential to be used as source habitats for woodpeckers and subsequently for secondary cavity users, provide unique habitats, facilitate nutrient cycling, and provide nursery sites for trees and shrubs.

Snag numbers vary in the green tree harvest areas of Alternative C and E based on the objectives of the alternative; however, both alternatives leave snag numbers consistent with historic snag levels based on plant communities and disturbance patterns.

In all alternatives, snags will be left primarily in clumps with others scattered throughout the units. The "patchiness" of fire is a desirable characteristic, and many species depend on the environmental influences that fires create (Beschta, et. al. 1995).

Detailed explanation of how the snag numbers selected were chosen and how that fits with Thomas and ICBEMP:

Snag numbers selected come from the Ochoco National Forest Viable Ecosystems Guidelines. These guidelines were developed on a plant community basis considering forest structure and disturbance patterns. The Ochoco Viable Ecosystems Guidelines have received extensive scientific review, including Governor John Kitzhaber's Scientific team. The analysis method outlined in the guide has been utilized to analyze over 1 million acres of Blue Mountain habitat similar to those found in the analysis area, some as close as 10 miles from the analysis area. In 1998 the Ochoco NF and the Prineville BLM completed a Sub-basin review for the Upper Crooked River (approximately 600,000 acres). This sub-basin review is being used as an example by ICBEMP of an appropriate process and scale for stepping down analysis from that done by ICBEMP.

ICBEMP identifies snag numbers for green tree replacement and provides species group analysis of snag and down log levels for the Interior Columbia Basin. Recommendations within the Final EIS indicate that snag and down wood standards are interim, and were assembled through a process that combined extensive reviews of the published and unpublished literature, numerous discussions with snag and down wood experts, and GIS computer modeling.

The Supplemental Draft EIS direction recognizes that these broad standards may require fine-tuning for more local ecological conditions. Review existing snag guidelines or develop guidelines that reflect local ecological conditions and address snag numbers, diameter, height, decay class, species, and distribution. Refinements should be within the disturbance regimes, potential vegetation groups, and structural stages from the Supplemental Draft EIS to allow summarization and comparison at the broad scale.

The Ochoco NF Viable Ecosystems guide identifies ranges of snags based on the vegetative composition, structure, and disturbance and is easily compared to the interim standards in ICBEMP (See Table 2 of the wildlife report). Recommended snag and down log levels identified in the Viable Ecosystems guide provide a range of potential conditions recognizing the potential for

different disturbance patterns to have taken place on a given piece of land. Snag and down log levels identified in ICBEMP generally fall in the middle of the range of numbers identified in the Viable Ecosystem Guide.

The following information contained within ICBEMP supports snag allocation numbers identified in the alternatives:
"Higher levels of snags and downed wood might be desirable or necessary to meet specific wildlife habitat needs, but may increase fire risks and affect such site factors as nutrient availability."

"Retain snags in clusters to provide adjacent roosts for maternity colonies. Maintain snags at higher than historical levels, to restore loss in previously harvested areas (ICBEMP 1996d)."

Response: Three species groups were identified with the use of snags associated with burns in ICBEMP and snag density recommendations made (Lewis' Woodpecker - 24/ac. > 9" dbh and 6.3/ac. > 21" dbh, Black-backed Woodpecker – 42/ac. >9" dbh, and Western blue birds 26/ac. > 9"dbh). By managing for 42/ac. > 9" dbh with at least 6.3 of those being > 21" dbh you would meet the habitat objectives for each of these species.

The amount of habitat that burned is not sufficient to provide more than 1 or two nesting pairs of these species based on home range sizes. The management allocation for this area is for maximum timber production. Snag levels prescribed in the alternatives will leave sufficient snags in the clumps to provide potential habitat for these species; however the entire area will not be managed for these species.

ICBEMP distinguished young forest habitat based on management of these areas with the following definitions:
"Managed young forest--Young-forest structural stages within areas that are roaded and that have some history of timber harvest and fire exclusion; typically contain relatively few large snags or trees >53 cm (21 in) d.b.h. (see table 4, vol. 1 for specifications of crown cover percentages and tree size classes for managed young forests)."

"Unmanaged young forest--Young-forest structural stage within areas that are unroaded, with fire exclusion and no history of timber harvest; typically contain relatively higher densities of large (>53 cm (21 in) d.b.h.) snags and trees than do managed young forests; see table 4, volume 1 for more specific descriptions."

Response: Leaving higher snag and down log levels within the intensely burned area recognizing higher snag level typical of unmanaged young forests.

"Condition of special habitat features--Abundance of large (>53 cm [21 in]), heavily decayed snags for nesting have been reduced basin-wide because of changes in vegetation structure from old-forest single stratum to mid-seral structures as well as snag removal by woodcutters (Hann and others 1997; Hessburg and others 1999; Quigley and others 1996)."
"2. (To address issue no. 2) As a short-term strategy retain all large-diameter (>53 cm [21 in] d.b.h.) ponderosa pine, cottonwood, Douglas-fir, and western larch snags within the basin, preferably in clumps, and provide opportunities for snag recruitment throughout the montane and lower montane communities. As a long-term strategy, conduct mid-scale assessment of species snag use and the dynamics of snags in landscapes and adjust the strategy or groups of subbasins."
"4) Reduce road densities in managed forests where ponderosa pines snags are currently in low abundance. Close roads after timber harvests and other management activities, and minimize the period when such roads are open, to minimize removal of snags along roads. In addition or as an alternative to road management, actively enforce fuelwood regulations to minimize removal of snags. 4. (In support of strategy no. 4) Restrict fuel wood permits to disallow snag cutting where ponderosa pine snags are in low abundance, and particularly where existing roads cannot be closed. Blair and others (1995) recommend that public fuel wood harvest should be limited to trees <38 cm (15 in) diameter at breast height (d.b.h.)."

Response: All design elements are consistent with this direction. Large snag levels within the intense burn are above historic levels and those in green harvest areas are at the high end of Historic Range of Variability (HRV) for Alternative C and at the low end of HRV for Alternative E. In all alternatives fuel woodcutting would be stopped for a period of 10 years to protect snag values. Closures of mechanical fire line and in Alternative C closure of additional roads will reduce the amount of area accessible for illegal fuel woodcutting. All Alternatives will close the entire area to off road use for a period of 3, 5, or 10 years, which will reduce the potential for illegal fuel woodcutting.